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THE NEW ZEALAND

JOURNAL OF AGRICULTURE

Vol. 68. No. 2.
February 15, 1944.
Wellington.

Published by direction of Hon. B. Roberts, Minister of Agriculture.

Message to Farmers From New Minister of Agriculture

A farmer of considerable experience and member for Wairarapa since 1935, the Hon. B. Roberts succeeded the Hon. J. G. Barclay as Minister of Agriculture and Marketing.

HON. B. ROBERTS

THROUGH the pages of the "Journal of Agriculture" I take this opportunity to address a message to farmers, whom I recognise as fellow-workers. I, myself, have been associated with farming since my early youth. At the age of twelve I first received a "hiring shilling" which bound me for one year to an employer for 1/6 per week as a ploughboy on a mixed farm on wet clay land in North Wales. For the past thirty-six years I have been on the land in the Wairarapa and have taken part in most practical work on the farm, first as a farm-worker and later as a dairy farmer and fruit grower.

In public life my interests have been centred mainly in the welfare of the farming community. I know farmers, I know their problems, and as Minister my personal knowledge will be used to the fullest extent in promoting a spirit of goodwill and mutual understanding, which I feel sure will benefit agriculture in this Dominion.

At no other period in the history of New Zealand has food production occupied a position of such importance. Food is a munition of war and one of our vital contributions to the war effort. The year 1944 will bring increasing demands on the primary producer, and every farmer who can step up the output of his holding will have made a further valuable contribution towards ultimate victory.

A heavy task faces the world today; at all costs victory must be won, and by our combined efforts we will materially assist the final achievement.

My earnest desire is to promote a full understanding between the farmer and myself. Their problems will be my problems and it is my sincere hope that together we will advance the rural development of this Dominion.

—B. ROBERTS,
Minister of Agriculture.

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How to Defeat Wood-Borers

The habits of the principal wood-boring insects in New Zealand, and methods for combating their attacks, are dealt with in the following article. The treating materials recommended are only those that are readily available to householders and usable without much risk. Simple methods for their application are detailed, together with information that will help in identifying the various insects.

— By —

J. H. SMITH & A. C. FORBES,
State Forest Service,
Wellington.

IT IS important to note that there is no short-cut to success in exterminating wood borers. Although the treatments recommended are easily applied, they call for painstaking care, and to be effective they must be persevered with over a period of years. Constant watchfulness is also necessary to prevent new attacks and reinfestations. Firewood, fencing timber, boxes and furniture are all possible sources of infection. Every piece of wood brought into a building or its vicinity should be examined with care, and control measures applied if required.

The principal wood-boring insects causing damage in buildings and interior woodwork are:—

(a) The common house borer (*Anobium domesticum Linn.*).

(b) The powder post bettles (*Lyctus* spp.).

(c) The native two-toothed longhorn (*Ambeodontus tristis* Fabr.).

(d) The native termite (*Calotermes brouni* Frogg.) and introduced Australian species.

Distinguishing Marks

The workings of the first three insects are distinguished by the size and shape of the flight holes made by the adult beetle emerging from the wood after undergoing the usual life cycle—grub and pupa—and by the frass left in the borings.

Termite attack may be distinguished by the presence of small, hard, round pellets of digested wood. In addition, the introduced Australian termites always maintain contact with the ground moisture by means of covered earthen runways, but the native termites inhabit and attack wood without requiring any direct ground moisture.

The house-borers and powder post beetles make holes from 1/32 to 1/16 inch diameter, while the two-toothed longhorn makes a large, oval exit-hole measuring from 1/5 to 1/3 of an inch along the major axis. The frass from the borings of the house borer are quite loose and feel coarse and gritty, as compared with the densely-packed, fine, flour-like powder left by the powder post beetle.

The workings of the two-toothed longhorn are distinguished by faint markings round the walls of the tunnels made by the larvae gnawing their way through the wood, while the tunnels are packed with undigested wood dust.

The common house borers and powder post beetles largely confine their attack to sapwood, the former principally in softwoods, e.g., rimu, and the latter exclusively in hardwoods, e.g., tawa. Both sapwood and heartwood are attacked by two-toothed longhorn and termites, the longhorn favouring softwoods, while termites attack both softwoods and hardwoods.

Life Cycles

The life of the common house-borer varies from one to three years. Eggs are laid in old flight-holes, as well as in cracks, crevices and joints, but never on perfectly smooth surfaces. As the grub grows, it bores in every direction in the wood. When it reaches maturity, it bores towards the surface of the wood and forms a small enlarged chamber in which it pupates. This chamber may be less than 1/32 of an inch below the surface of the wood. The perfect beetle emerges generally between December and March in Wellington, but somewhat earlier in the North and later in the South.

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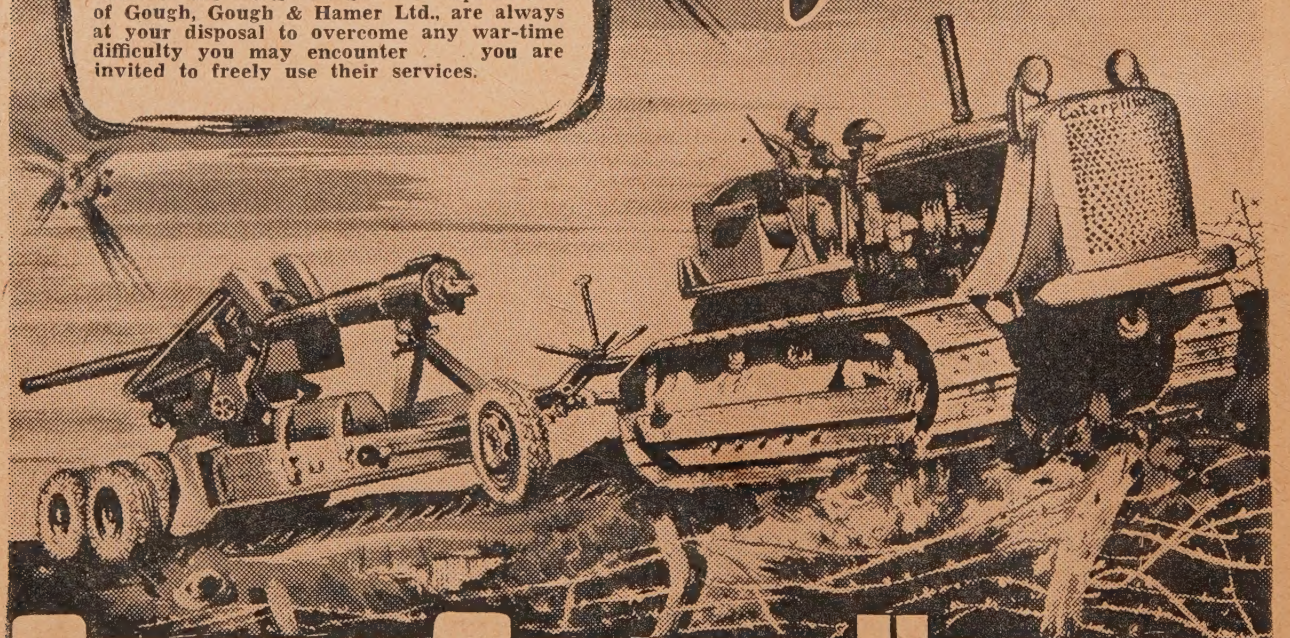

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The adult hardwood powder-post borer (magnified).

The adult beetles vary from 1/10 to 1/4 of an inch in length. They are boat-shaped in form and red-brown to dark-brown in colour. The head is withdrawn beneath a hood. These beetles are reported to be most active at dusk and during the night, although attracted in daylight to those portions of the building receiving direct sunlight. Generally, they tend to inhabit old flight holes by day and to lay large numbers of eggs in them.

Powder-Post Beetles

The powder-post beetles commonly have a life-cycle of one year, and lay their long, cylindrical eggs in the cavities of exposed hardwood pores, never in cracks or crevices or on smooth surfaces. The eggs hatch out in a few weeks, the grubs boring immediately into the timber and tending to follow the grain much more consistently than the house-borer. The frass produced is fine and tightly packed, as compared with the gritty and loosely packed frass of the house borer.

The pupal chamber is constructed close to the surface of the wood, and the beetles emerge at about the same time as the common house-borer. Although somewhat shorter than the house-borer — from 1/10 to 1/7 of an inch in length — they are more elongated and flattened, and are brown to black in colour. All species of *Lyctus* beetles are distinguished from *Anobium domesticum* by the fact that the head is visible from above, projecting beyond the thorax and hood. Unlike the common house-borers, they seldom fly during the day, shunning the light and collecting on the dark undersurface of infested timber.

The adult common house-borer (magnified).

Two-toothed Longhorn

The two-tooth longhorn has a life-cycle of at least three years, if not considerably more, and deposits its eggs in cracks, crevices and joints under slight projections or on the surface of roughly sawn wood. The larvae, which are whitish in colour with a blackish head, bore along the grain and pack their tunnels with undigested wood dust. Well-developed specimens attain a length of 1 inch. They make faint markings running round the walls of the tunnels while gnawing their way through the wood. In emerging from their pupal chambers, the beetles leave characteristically oval-shaped holes, with a major axis of from 1/5 to 1/3 of an inch. Their maximum emergence months throughout the country are April, May and June. They are from ½ an inch to 1 inch in length, narrow-bodied, and chocolate to reddish brown in colour, and are characterised by a pyramidal spine on each side of the fore thorax,

Adult beetle of two-toothed longhorn.

while on the upper surface a pair of knot-like swellings project. The beetles shun bright light, and prefer to emerge on the concealed surface of the wood, such as the underside of floors, etc., where the flight holes ordinarily go unnoticed.

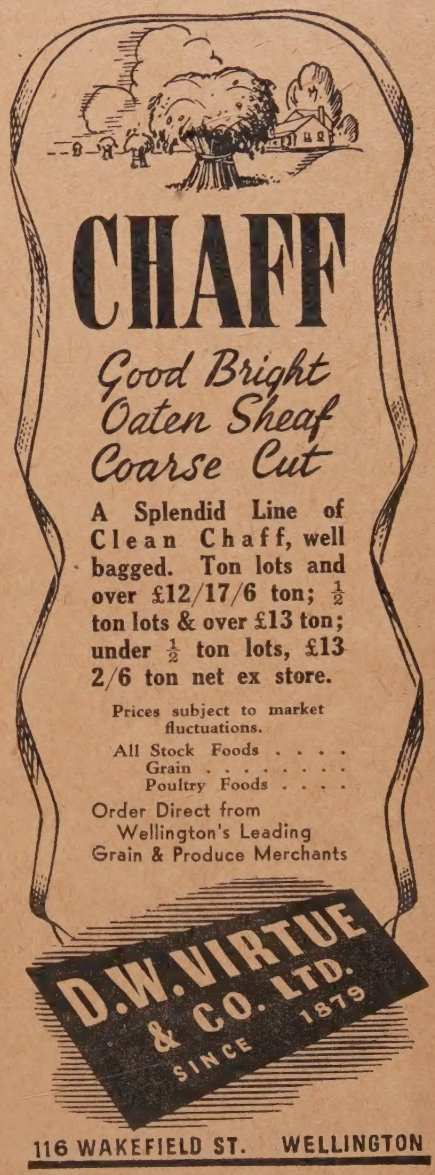
Termites

Termites , often erroneously called "white ants," form colonies, which are divided into castes. Winged adults form the reproductive caste, and are present in the colony during spring, summer or autumn. Workers are the most numerous members. Blind, white in colour, and soft-bodied with inconspicuous jaws, they are usually the smallest of the forms, but nevertheless perform the major work. They gather food, feed the royal pair, soldiers and young, build mounds, tunnels or nests and generally act as scavengers.

The soldiers are wingless, sterile and generally blind, and have elongated heads with conspicuously large jaws.

The food of termites generally consists of cellulose, but they may eat leather, bone, leaves, grass or sugar. They do not form mounds, but construct irregular, and at times extensive, burrows in timber, a characteristic feature of these workings being the large number of fecal pellets which are deposited.

There are two New Zealand species, *Calotermes brouni* and *Stolotermes ruficeps*, belonging to the dry-wood group. They are mainly found in the forest, but *C. brouni* is found infesting houses. Three species of the "earth dwelling" termites from Australia are now established in New Zealand, and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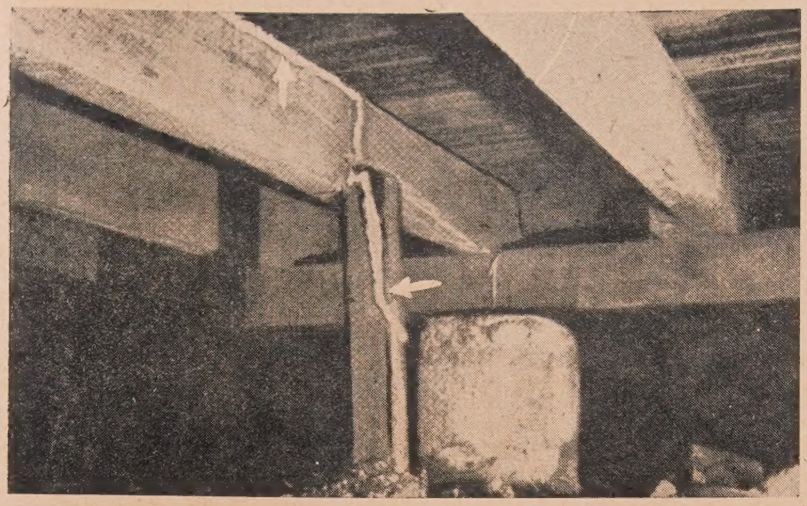

Foundations of a recently-built house being attacked by subterranean termites. Note the termite runways.

in a few localities do considerable damage to houses, being especially active in floor joists, flooring, weatherboarding and studs. These three species are *Coptotermes acinaciformis*, *C. lacteus* and *C. frenchii*, and of these the former is the most widespread in its distribution.

Detection of Borer

The first action against borer attack is a thorough survey of every piece of timber on a property—firewood, boxes, furniture, and the buildings. All timber showing flight-holes should be regarded with suspicion and subjected to the minutest scrutiny. Are insects still working in it or not? That is the practical question. In the interior of buildings and in furniture signs of active attack are readily available in the new appearance of the last year's flight-holes, the insides of which appear quite fresh and light coloured. In exterior timbers, these weather rapidly, and additional evidence must often be looked for. Any discharge of powdered wood from exit-holes should be regarded as prima facie evidence of attack, and the timber earmarked for treatment. This discharge may take place at practically any time of the year owing to newly created frass being forced out through old exit-holes, but it is most noticeable at the time the insects are approaching the surface to form their pupal chambers, so inspections should always be made at the appropriate periods of the year.

Even where no exit-holes have yet appeared, a discharge of frass may take place at joints or cracks in the timber as the larvae pass these points in their borings. In the case of the powder-post borers, a minute discharge is possible also through the pores of the hardwoods infested. Literally, every piece of timber which can be examined in a building should be carefully inspected. Both sub-floor and roof timbers should be inspected wherever possible, the former in particular, for signs of attack by the two-toothed longhorn.

Further Inspections

It is not sufficient, however, to make only one such inspection, treat the affected woodwork, and imagine that the problem is solved. Two inspections should be made regularly each year in the early spring and the late summer and autumn, and the appropriate measures applied on each occasion. Furthermore, each piece of wood brought on to the property at any time, whether in the form of firewood, boxes, timber, or furniture, should be carefully inspected, and, where necessary, treated.

Failure to observe these precautions may result ultimately in attack or re-infestation. The importance of making regular inspections in the case of newly-erected buildings cannot be overstressed, as the early detection of attack will facilitate treatment and simplify subsequent preventive measures.

It must not be thought that, because the timber has been sterilized by kiln-drying, it is immune from further attack. This is not so. It may be attacked like ordinary air-dried timber.

Needless to say, the greatest care should be exercised in the erection of new buildings, and the employment of an architect who will carefully examine all timber is invariably to be recommended. Where the timber has only just become infested, however, and no flight-holes are visible, the attack is extremely difficult to detect, and experience indicates that a few boards of infested material sometimes go into new buildings. It is, therefore, particularly important for the first few years to make very careful inspections, and as soon as any flight-holes or other evidence of attack become apparent to apply a suitable treatment immediately, preferably the same day, to confine the attack to the boards originally infested. Particularly in the early stages of infestation, the adult common-house-borer-beetles tend to inhabit their exit-holes during the day and to lay the greater number of their eggs in them so that the early detection of flightholes is of major importance.

Observations for new flight-holes should begin about October in the North and December in the South, and continue at appropriate times. Where old flight-holes are present, earlier signs of activity will be apparent from

Portion of white pine board showing the sap (right) damaged by the common house-borer and the heartwood (left) so far undamaged.

frass forced out of these by larvae working in the vicinity.

Treating Materials

There are numerous preservatives possessing some merit for treating timber to resist borer attack, but many of them (such as arsenic compounds) are highly poisonous, and dangerous not only to the person applying them but also to subsequent users of the timber or occupants of dwellings. For this reason, the materials recommended in this article have been limited to those which are relatively safe to use and yet effective against wood destroyers.

The protective effect is achieved by making the wood poisonous or repellent to the organisms that would otherwise attack it. The chemical substances used for this purpose should be poisonous to the wood-destroying organisms, permanent, highly penetrative in wood, safe to handle and use, and also inexpensive. For the treatment of building timbers and furniture, they may also require to be clean, colourless, odourless, paintable, or non-swelling.

For either exterior or interior use where its smell is not objectionable, and may even be advantageous, as on many farm outbuildings, creosote is undoubtedly the most effective material. It may also be used for treating subfloor timbers of dwellings, where its smell should not be too objectionable, but greater discretion is required in its use for roof timbers, since the heat generated under galvanized iron may be sufficient to make the smell objectionable.

When purchasing creosote, it should be specified that it comply with the requirements of British Standard Specification, No. 144-1936.

Interior Work

Where a relatively clean treatment is desired, such as for surfaces to be painted, house interiors and furniture, a toxic chemical dissolved in a cheap organic solvent is recommended. High volatility is a desirable feature of the solvent since it can then evaporate from the wood in a short time after the treatment. As it evaporates, it leaves the toxicant in the wood, which is then in a suitable condition for the application of finishes (paint, stain, or varnish) or for immediate use.

One of the toxic chemicals recommended for this type of preservative is pentachlorphenol. Besides being highly toxic, it has a very low solubility in water, and is, therefore, suitable for outdoor use where a more soluble chemical would, in time, be leached out of the wood by exposure. Suitable solvents for pentachlorphenol

Badly borer-infested timber after removal from a Wellington building.

are light fuel oils, such as diesel oil or kerosene, but as the solubility of pentachlorphenol in these materials is limited, it is usually necessary to add a small quantity of a substance having a higher solvent power, for which purpose pine oil, benzole, or orthodichlorbenzene is suitable.

A treating solution containing not less than 5 per cent. by weight of pentachlorphenol should be used, made up as follows:—

Pentachlorphenol	**5**	**parts**	**by**	**weight**
Light diesel oil or kerosene	**94**	„	„	„
Pine oil	**1**	„	„	„

Instead of pine oil, benzole or orthodichlorbenzene can be substituted, but it may be found necessary to use up to 3 parts, in which case the proportion of diesel oil or kerosene should be reduced to 92 parts. It should be noted that the solvent power of light fuel-oils for pentachlorphenol varies considerably and it may be found possible to dispense with the additional solvent altogether, or in other cases to increase the proportion of it.

Diesel oil is not very volatile. Hence, after treating, some days should elapse before applying paint coats or putty. Kerosene is somewhat quicker-drying, and is more suitable for treating solutions to be used inside dwellings, particularly on surfaces to be covered by wallpaper. Both diesel oil and kerosene, especially the former, have a slight staining-effect on wood, but it is usually of no consequence.

In preparing a treating solution, it is recommended that the pentachlorphenol be first soaked for a day or so in a solution containing all the additional solvent (pine oil, benzole or orthodichlorbenzene) and a small quantity of the diesel oil (or kerosene), the remainder of the latter being added finally. Prolonged stirring will probably be found necessary, and while gentle warming considerably hastens the process of solution, it is not recommended on account of the fire risk.

Water solutions of toxic salts, such as zinc chloride, are recommended only for treating timber before it is put into use, as the swelling and shrinkage of the wood which accompanies changes in its moisture content would, in most cases, be objectionable for timber in situ.

Need for Permanence

The need for permanence in a preservative is obvious. No material that evaporates from the wood in a few years, or that changes chemically in a short time into ineffective compounds, is suitable. For instance, paradichlorbenzene, orthodichlorbenzene and cresylic acid are sufficiently toxic, but too volatile to remain in the wood for any length of time, so that although they will eradicate borer, they will not prevent future attack.

When purchasing a made-up preservative, the consumer should know just what he is buying. It is unwise for him to trust the life of his wood structures to preservatives of unknown composition or to invest his money in materials that may differ widely in quality from time to time without his knowledge. He is very likely to pay exorbitant prices for cheap, ineffective, or inferior materials. Before investing any appreciable amount of money, the consumer should insist upon knowing the precise composition of the preservative he plans to buy. When convenient, it is also wise for him to have analyses made to see that the material furnished complies with the stated formula or specifications.

Methods of Treatment

No matter how good a preservative may be its effectiveness depends on the thoroughness with which it is

applied. The aim is not only to destroy the larvae, thus preventing the emergence of the adult beetles and the extension of their attack to other woodwork, but also to obtain a substantial absorption and deep penetration of the preservative into the timber to render it immune from future attack.

Unfortunately, the most effective treatments involve, among other requirements, complete immersion of the wood in the preservative, but for timber in situ such processes cannot be carried out, so brush, spray or similar methods must be resorted to. In using such methods, the preservative should be flooded over the surface of the timber and allowed to soak into the wood as much as possible; it should not be brushed out thin, like paint.

Two coats provide much better protection than one, but the second coat should not be applied until the first has dried or soaked into the wood. All cracks, crevices, joints and other openings should be filled as thoroughly as possible. In particular, care should be taken to force the preservative into the flight holes, and while a hand pressure pump of the nature of a large hypodermic syringe would be useful for this purpose, its use may necessitate considerable patience, and the employment of firms equipped with power driven compressors and special injector guns may often be justified. If a large capital outlay is involved, the employment of an architect or master builder to superintend the work is recommended.

Reinspections

Although a large measure of success should be attained by the adoption of the above described methods, the superficiality of the treatment does not ensure that all larvae have been destroyed or that the wood is immune from further infestation. It has been demonstrated that termites are skilful in utilizing any weak points in the protective shell of treated timber, and under laboratory conditions have been observed, in the absence of untreated wood, to attack and penetrate only the thinly impregnated portion to reach the untreated wood within, leaving the thickly impregnated portion untouched, when the two are equally available. Although such observations were made with termites, it is a reasonable assumption that other wood-boring insects would show similar discrimination. This shows the need for careful reinspection.

Flooring-board attacked by larvae of the two-toothed longhorn. Note typical oval shaped exit holes and damaged interior of board.

In some buildings, the incidence of attack may be so general, and the depredations of the beetles so far advanced, that any treatment is of doubtful value, but in all cases of localized and selective attack the appropriate measures will fully repay the expenditure of considerable time and money.

Removal of Boards

In the case of a new house where the attack is confined to perhaps only one or two boards, their removal is strongly recommended and should be seriously considered if at all practicable.

Particular attention should be paid to attacks by the two-toothed longhorn. The depredations of this insect may extend for several feet beyond the last flight holes, and other timbers in contact with the affected boards may also be infested. So destructive are the activities of these insects that exploratory borings or probings should be made in the vicinity to ascertain the full extent of their workings. Heavily infested flooring should be removed immediately and, if the attack has spread to floor joists, heavy injections of a preservative should be applied.

Where the strength of joists would not be seriously affected, large auger holes may be bored and filled with preservative from time to time as it seeps into the timber. The holes should be placed beyond the region of attack so that a heavy impregnation of the entire cross section will form a barrier to the progress of the boring larvae. It should be remembered that preservatives seep along the grain much more rapidly and easily than across it. Holes should thus be as deep as possible, and located with this in mind. Preferably, timber badly attacked by this insect should be renewed, and the removed timber at once burnt.

Special methods are required to deal with the recently introduced Australian termites which at present are restricted in their distribution to Auckland city and suburbs and the borough of New Plymouth. If their presence in a building is suspected, the local authority should be notified immediately.

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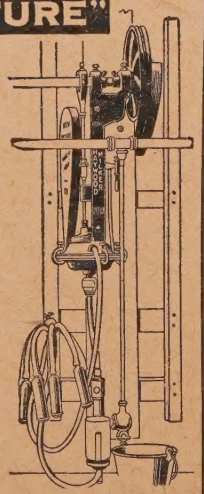

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FARM SHELTER

By P. S. SYME,
Instructor in Agriculture,
Warkworth

Good farm shelter is a necessity rather than a luxury, as shown by the fact that close attention has been paid to this point on practically every farm in New Zealand which shows an outstanding herd average. Best results are obtained if the provision of shelter is planned ahead, and useful suggestions are contained in this article.

AS a dairying country New Zealand has undoubtedly been favoured by climate beyond all of her competitors. Even here, however, the sun does not always shine, and although the climate might fairly be described as mild and equable throughout the year, a small country set as a speck in the surrounding ocean must frequently experience stormy winds. These, particularly in exposed districts, are apt to be persistent, and can at times be very cold and wet. Even in the most favoured districts, good shelter may rightly be regarded as a necessity rather than a luxury, and any money or labour wisely invested in the provision of shelter can confidently be expected to pay very handsome dividends.

While it is admittedly difficult to assess the value of shelter in actual figures, experience and common-sense alike suggest that the value must certainly be high, and the fact that close attention has been paid to farm shelter on practically every farm in New Zealand which shows an outstanding herd average is not without significance. As an animal normally maintains its body temperature by the consumption of food, it is evident that exposure to severe cold must necessitate extra feeding, or the animal must consume its own fat. Proper shelter is cheaper than either of these alternatives.

Work Should Be Planned Ahead

The provision of adequate shelter frequently demands much careful thought, and the best results cannot be expected from spasmodic and haphazard plantings. To achieve complete success, the work should be planned well ahead, considering the layout of the farm as a whole as well as the needs of individual fields. By working to a programme and spreading the plantings over several years, the work can be methodically performed, the most suitable species can be selected, and costly mistakes can be avoided.

The fool buys his experience. The wise man gets the fool's experience for nothing and profits accordingly. Considerable loss and disappointment are the inevitable results of planting unsuitable species, and every possible care should be taken in advance to ascertain, both by personal observation and inquiry, whether or not any species selected is likely to thrive under local conditions.

If a programme is carefully designed in advance the various operations of preparing the ground and planting can be carried out systematically, each at the proper time, while considerable economies can also be effected, as the farmer is enabled to raise his own plants in succession ready for planting out as required.

Types of Shelter

In designing the plan to be followed, consideration is usually given to two distinct types of shelter—high breakwinds to protect the farm against the worst prevailing winds, and a series of low, dense hedges to provide shelter

1. Summer shade is just as essential as winter shelter.

2. *Cup. lawsoniana* makes an excellent hedge.

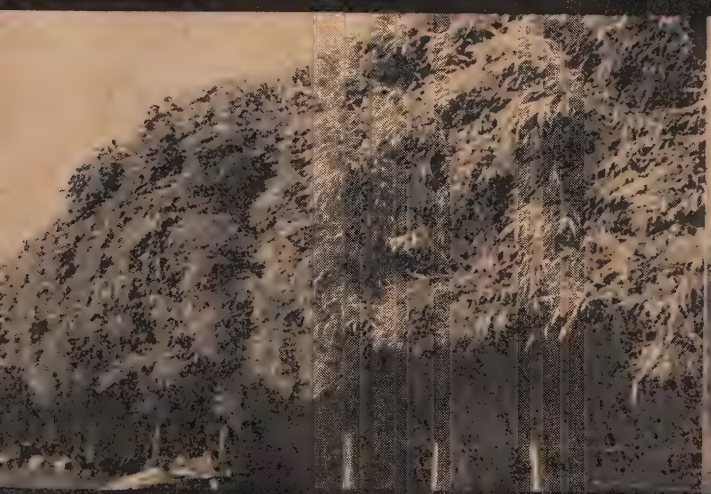
3. Poplar and *Eleagnus* do not shade the ground in winter to the same extent as a tall evergreen breakwind.

4. A good hedge of *Cup. benthamii.*

5. Pampas grass hedge on a Manawatu farm.

6. Combination of high and low shelter, flax and poplar.

7. Flax hedge on a dairy farm.



8. A bamboo hedge gives shelter as well as shade.

9. A poor breakwind. Note the absence of shelter near the ground.

for individual fields. In addition, the possibility of utilising any waste ground to provide for future needs of home-grown timber should be taken into account.

Whether or not high windbreaks are necessary depends largely on local conditions, the degree of exposure, and the severity of the prevailing winds. If properly designed, such a windbreak will provide shelter for considerable distances. Experiments have shown that a shelter belt 66 ft. high will afford protection for about five chains and partial protection for about 15 chains.

The direction of such shelter belts should generally be from north to south, as this gives protection from the most prevalent winds, and at the same time does not result in excessive shading during the winter. With a 60 ft. shelter belt running north and south, the eastern paddocks are in full sun from sunrise until 12.58 p.m., and western paddocks from 11.20 a.m. until sunset. With an 80 ft. shelter belt running east and west, a shadow 136 ft. long will be cast even at midday in North Auckland, and in Southland the corresponding shadow will extend as far as 200 ft. into the field.

This aspect is sometimes unfortunately overlooked, particularly when providing tall shelter around the dwelling house, and is apt to be realised only too late.

Important Factors

In providing for high windbreaks, the severity of the winds and the proximity to the sea will to some extent determine the size and thickness of the shelter belts as well as the species which can be safely planted. The size of the farm, the value of the land, and the labour available for planting operations and the subsequent upkeep are also important considerations.

Although trees for tall shelter are sometimes planted in single lines, in practice this method does not usually prove very successful. If the timber itself is to have any real value the trees must be planted close. When planted in single lines, blanks occur through trees dying, and in any event the trees themselves tend to open out at the base, with the result that the draught of wind is colder under the trees than in the open paddock. If high shelter is essential, and if circumstances permit, such shelter belts should preferably be not less than about half a chain wide, and may with advantage be one chain wide or more.

The following are suggested as likely to be suitable for varying conditions.

(1) FOR COASTAL DISTRICTS:

Where the locality is exposed to very severe and constant winds, as on parts of the West Coast, some difficulty may be experienced in establishing shelter breaks, and it may be necessary to provide first an artificial windbreak of tea tree scrub and to plant natives, such as *Veronica elliptica, Pittosporum crassifolium,* and flax, on the lee of this. Once these have established, a belt of ground may be prepared on the lee side and planted somewhat as follows:—

One or two rows of *Pinus pinaster* fronting the seaward side spaced 6 ft. each way.

One or two rows of *Pinus pinaster* or *P. muricata* spaced 6 ft. each way.

A few rows of *P. radiata* spaced 6 ft. each way.

One row of *Cupressus macrocarpa* 5 ft. apart and about 20 ft. from the pines.

If the soil is sandy and if there is a possible danger of serious wind erosion the young trees are best planted direct without preparatory cultivation, but if no such danger exists preparatory cultivation may be highly advantageous in assisting growth.

Pinus pinaster and *P. muricata* succeed on very poor sandy soils, and are well adapted—*P. pinaster* in particular—to withstand saline winds. *Pinus radiata* and *Cup. macrocarpa* do not withstand saline winds quite so well, but they will succeed on poor, sandy soils, and will provide more valuable timber.

(2) FOR INLAND DISTRICTS:

Where winds are not laden with salt and are less severe, a narrower belt may be quite effective. The wide variety of trees available allows of considerable scope, particularly if the shelter belt is to be fairly broad. Generally, the aim should be to plant good wind-resisting species on the windward side to provide quick shelter and to act as nurse trees for other less hardy or slower growing species. Since most of the taller growing species tend to open up at the base, it is desirable to include some species which will provide good permanent ground shelter or to make provision for a good shelter hedge such as *Lawsoniana, Eleagnus,* boxthorn, etc. If the hedge is not a good shade enduring species, it is important to see that it is placed far enough from the belt to prevent shading when the trees are full grown.

It will usually be found that as a nurse tree, *P. insignis* grows too quickly, and is apt to overcrowd and kill slower growing permanent trees. For this reason, *P. muricata* is frequently to be preferred, as it allows other trees to grow close to it and is itself very free from disease and pests.

The following makes an excellent shelter belt: One or two rows of *Corsican* pine, 6 ft. apart, on windward side; one or two rows of *P. muricata,* 6 ft. apart; one row of *Cup. lawsoniana* or *Cup. benthamii,* spaced 4 ft. apart, and about 20 ft. from the pines.

If preferred, the shelter may comprise *P. insignis* on the windward side followed by *black wattle, macrocarpa, eucalypts* and some good hedge species. This arrangement has the advantage of providing a supply of useful farm timber and still maintaining good shelter after the quick growing species have been cut out.

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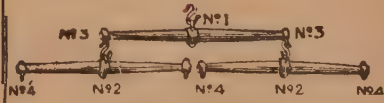

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Lombardy Poplars

Where wide shelter belts are impracticable because of the high cost or for any other reason, effective shelter may be provided by planting a double row of lombardy poplars, allowing about 6 ft. between the rows, with the trees spaced about 6 ft. apart. A row of *Eleagnus japonica* is then planted between the rows of poplars, allowing about 2½ ft. between plants. Given proper support, the *Eleagnus* will climb to a considerable height, and will require little attention. An alternative to this method is to plant the lombardy poplars in three rows, these being alternately cut back as required to provide bottom shelter.

When planting under favourable conditions, cuttings up to 7 ft. long may be used. They should not be driven into the ground, as the bottom bark is then torn off and a poor strike may result. The best method is to use a crowbar to make the hole, and to place the cutting in this with the butt resting firmly on the bottom, taking care to tramp the soil so as to provide a good contact and a firm support.

On grounds of economy this poplar has much to recommend it, as it is easily started from cuttings taken in the dormant stage, particularly if the soil is fairly moist but not waterlogged. The trees will grow to a height of 80 ft. where conditions are favourable, and being very erect in its habit of growth it occupies relatively little ground space. The fact that it is found growing successfully throughout the length of New Zealand indicates its adaptability to a wide range of soil and climatic conditions. This variety should not be confused with the common silver poplar, which is seldom recommended on account of its suckering habit.

Eucalypts

Eucalypts are sometimes planted alone for shelter belts, but they tend to become bare below and allow light to enter freely, so that weed growth is encouraged. Good shelter belts may be formed by planting one or more rows of eucalypts suited to local conditions with a row of *Cup. lawsoniana* or *Cup. benthamii* or any other suitable hedge plant placed about 8 ft. from the eucalypts.

Apart from actual shelter belts, excellent results can be obtained by planting blocks of trees in selected corners so that each block will provide shelter for a number of fields. For this purpose *Pinus muricata* and *Cup. lawsoniana* are probably the most suitable trees, but if the object is to provide useful timber as well, suitable eucalypts may also be included.

If it is intended to plant eucalypts, particular attention should be paid to see that the varieties selected are such as will suit the district and will ultimately provide some useful timber. It should be remembered that in this respect climate is of prime importance, whereas soil, provided it will supply plenty of moisture, need not be of very high fertility. Many species of eucalypts are susceptible to salt winds and do not readily succeed on exposed positions in coastal districts.

Planting for Farm Timber

Where the main object is to utilise waste ground for useful farm timber, *Pinus radiata* and *Cup. macrocarpa* can be safely recommended over a wide range of soil and climatic conditions. It is very important to remember, however, that these, particularly the *macrocarpa*, will eventually grow to a considerable size, and on this account require a good, deep soil to provide adequate root hold. If planted on low-lying ground where the water table is not far from the surface, *macrocarpa* will grow well as a young tree, but as the roots will not penetrate below the

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water level, the trees are very liable to blow over when they get larger.

On wet soils, eucalypts are probably to be preferred, and such species as *E robusta* will succeed even on relatively wet ground. Black wattle was at one time widely grown in mixed shelter, but its use cannot now be recommended, as it is very liable to attack by the gall fungus.

Farm Hedges

Although tall windbreaks are frequently very desirable, particularly on flat and exposed country, they are not always practicable where the land is valuable or the farm small; but whether they are provided or not, the importance and value of a series of well-designed, low shelter hedges to protect individual fields can scarcely be over-estimated. These hedges need not necessarily be very extensive, and should be so planned and situated as to afford the maximum of protection for a minimum of cost.

The ideal hedge should establish easily and quickly to form a dense, impenetrable windbreak non-poisonous to stock. It should also occupy little space, require a minimum of attention, and should have a long, useful life. Such a hedge should itself be immune to disease, and should not harbour diseases or pests. If, in addition to possessing all of these good qualities, the hedge would require no fencing, then it would indeed be perfect.

Unfortunately, in an imperfect world we can scarcely hope to find a perfect hedge, and must simply endeavour to select the species of hedge plant which most nearly conforms to the varying local requirements and conditions.

Main Species

Although the list of possible hedge plants is a long one, practical requirements on the average farm can generally be met by a selection from the following species:—*Cupressus lawsoniana, Cupressus benthamii, Cupressus macrocarpa, Hakea saligna,* seedless barberry, *Acacia verticillata,* boxthorn, *Eleagnus japonica,* bamboo, and under certain conditions New Zealand flax and pampas grass may well be worthy of inclusion.

Cupressus lawsoniana: Of the species mentioned, *Cup. lawsoniana* most nearly conforms to the ideal. It maintains close, dense growth from the ground upwards right into its old age, and has a useful life of 50 years or more. It will grow about 2 ft. each year, and while it forms excellent low shelter in its early years, it is capable of ultimately forming a perfect unbroken windbreak 40 ft. high, or more.

Unlike many shelter trees, it does not develop a wide spreading habit, and even at maturity occupies comparatively little ground space. Moreover, though it can, if desired, be controlled by light trimming as a garden hedge, it does not require trimming when grown as a field shelter.

Unfortunately, with all these virtues, *Cup. lawsoniana* has a number of inherent weaknesses. It is not very tolerant of wet soils or of saline winds, and does not thrive where the climate is very dry. On the well drained pumice and alluvial soils of the Rotorua and Waikato districts, it is almost the perfect shelter hedge.

On heavy clay soils which tend to lie wet through the winter months, *lawsoniana* has not generally proved very successful, and on this account it is seldom seen growing well as a farm hedge on the gumland soils. When intended for low shelter, the plants should be spaced at about three to four feet apart. For taller breakwinds where the hedge is to be untrimmed, the distance between the plants may with advantage be extended to about six or seven feet.

Cupressus benthamii

On soils which are rather too wet for *lawsoniana* or *macrocarpa, Cup. benthamii* may sometimes be planted with success. Apart from its better toleration of moist conditions, the essential requirements of this species are somewhat similar to those of *lawsoniana.* It is, however, a faster grower than *lawsoniana* but is more spreading and does not usually provide so dense a hedge. Like *lawsoniana,* it will not tolerate salt winds. Plants may be spaced at about the same distances as for *lawsoniana* according to the object in view.

Cupressus macrocarpa

Although it is by no means ideal for single line shelter, its ability to thrive on soils where better hedge plants often fail, together with its adaptability to a wide range of climatic conditions have led to the very common use of *macrocarpa* throughout both islands. Because of its tall growing and wide spreading habit, it is difficult to control, particularly as, like all conifers, it does not readily withstand severe cutting back. With regular light trimming and an occasional careful topping, however, macrocarpa can provide useful low shelter for quite a number of years, and if the trees should open up at the base at a later stage, it may, if desirable, be possible to improve

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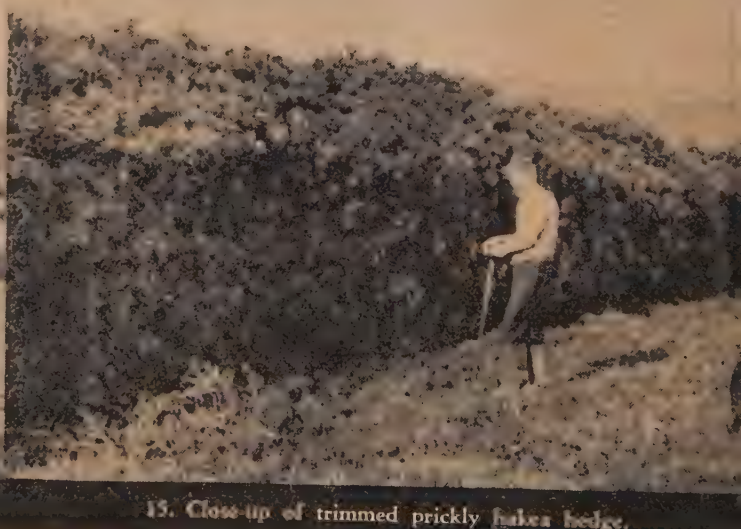
10. *Acacia verticillata* succeeds well on Northern gumlands.

11. Land with high water table is unsuitable for macrocarpa.

12. Gall fungus prevents the satisfactory use of black wattle for hedges.

13. Untrimmed *Eleagnus* makes an impenetrable but untidy shelter.

14. Well-trimmed prickly hakea hedges.



15. Close-up of trimmed prickly hakea hedge.

the bottom shelter by underplanting with a row of eleagnus or boxthorn.

Provided they are protected from stock, the trees will preserve their lower branches indefinitely, but this entails wide double fencing and is too wasteful of ground to be generally practised unless where used to suppress weeds along a stream, roadside or waste ground. Despite its obvious drawbacks, it must be admitted that the practice of planting *macrocarpa* along fence lines as adopted by many of the pioneer settlers has paid dividends in both shade and shelter, and is now providing a much appreciated supply of durable fencing timber suitable for a wide variety of farm purposes.

When grown for low shelter, plants may be spaced from about 4 ft. to 6 ft. apart. Plantings are sometimes made at 9 ft. intervals, but for low shelter this is too wide, as the plants take longer to close the gaps and the hedge tends more readily to open at the base.

Hakea saligna

Hakea saligna (plain-leaved hakea) is particularly well adapted to the heavy gumland clays of North Auckland, where it is a rapid and vigorous grower and succeeds well on soils which are naturally very poor and which tend to be wet and cold throughout the winter. *Hakea saligna* also has the distinction of being practically the only hedge which can be easily grown on certain of the semi-barren ironstone soils.

Protection must be afforded against stock in the early stages, but, once well grown, the hedge is fairly resistent to stock, and one or two barbed wires will usually prove sufficient provided the fence is not placed too close to the hedge. If well wrenched, *Hakea saligna* transplants easily, and quickly provides effective shelter. The plants are usually spaced at about 1½ to 3 ft. apart, according to the type of hedge required.

Hakea acicularis

Hakea acicularis: (*Prickly hakea*): This species is very similar to *H. saligna* in its soil and climatic requirements and is found growing naturally on many areas of poor gumland soil throughout North Auckland. Its main virtues are that it is easy to grow and is practically stock-proof.

The hedge can be most conveniently established by using 2-year-old plants, each lifted in a triangular block by three cuts of a spade, and planting them under a fence line about 18 ins. apart. Frequent light trimming is important in the early years.

Prickly hakea grows to a height of from 9-10 ft. and can be used to best advantage in some of the warm northern districts on soils where better species of hedge do not succeed.

Acacia verticillata

A hedge of *Acacia verticillata* also succeeds well on the heavier clay soils. As it does not, as a rule, transplant well, hedges are usually grown from seed. The ground should be clean and well cultivated to assist growth and establishment in the early stages. The seed is generally sown about September at the rate of about 1 oz. per chain.

If good, well-wrenched plants are available they may be successfully planted out on well-prepared ground in late August or September, and should be spaced at about 18 inches apart in the row. The hedge will grow to a height of about 10 feet, and it should be well trimmed after the first year to provide thick, bushy growth.

Because of its prickly nature, fencing is almost unnecessary once the hedge is properly established. As the prickles are apt to lodge in the wool, this hedge is not very suitable for sheep.

Seedless Barberry

Seedless barberry succeeds best on free, well-drained soils, and commonly fails on heavy clay soils or where drainage is poor. Provided conditions are suitable, however, barberry forms an excellent stock-resisting hedge which does not require fencing, and which can be very easily established from cuttings. Although the cuttings may be planted direct, in practice it will usually be found that many will fail to strike, so that the establishment is rather patchy and somewhat slow.

The best results are to be expected if the cuttings are started in a nursery bed where the ground has been well worked and where weeds can be easily controlled. If planted in this way from June to August the cuttings will have rooted freely and will be ready for planting out by the following autumn. The plants may be put in a single row spaced at about 15 to 18 inches apart under the fence, where they will be safe from stock. If the ground can be worked over before planting the young plants establish better and make more rapid growth. Thorough firming in position is a great help, and it is important that each plant should be well heeled in.

Eleagnus japonica

Owing to its ability to thrive under a wide range of soil and climatic conditions quite unsuitable for other hedge plants, this species has much to recommend it as a farm hedge. It is very hardy and will succeed even on quite wet land or on poor, heavy clay soils. It is not affected by salt winds and can tolerate dense shade. In addition, once established, it is practically stockproof and will stand a considerable amount of neglect.

When grown by itself, a hedge of *Eleagnus japonica* is apt to become straggly and untidy, but when grown in conjunction with barberry on suitable soil it will provide dense shelter, although it requires frequent trimming. If it is interplanted with tall-growing trees, such as Lombardy poplar, *Eleagnus* is capable of growing to a considerable height and forming a dense, draught-proof hedge which requires no trimming.

Although *Eleagnus* establishes easily from cuttings, the best results are obtained if the cuttings are first rooted in a nursery and transplanted to their permanent position in the second year.

Eleagnus has proved highly successful throughout the northern gumlands in situations where other common hedge plants will not grow, and there can be no doubt that there are many districts where its use could with advantage be considerably extended.

African Boxthorn

African boxthorn is well-known as a rapid grower which quickly forms a very thorny stock-proof hedge, and is particularly well suited for coastal districts because of its ability to with-

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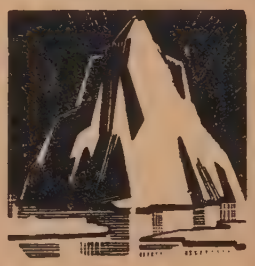

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stand salt-laden winds. It succeeds quite well even on poor, light, sandy soils, but almost invariably fails on heavy land or where drainage is bad.

Although it makes an effective barrier to stock, it is rather objectionable because of its sharp spines, which may be dangerous to stock, and which make trimming a somewhat difficult job. Plants are easily raised from seed, and are also cheap to buy. When planting a hedge they are usually spaced at about 18 inches apart. On account of its shade enduring qualities this species is sometimes employed to prevent ground draughts under pine or macrocarpa trees which have opened out at the bottoms.

Bamboo Hedges

Bamboo hedges have proved highly successful in flat, alluvial wind-swept areas in certain districts where other hedges are not easily established. The young plants are usually planted in the autumn in a single row about 1 ft. apart, and quickly establish to form a dense wind-proof barrier. As the young shoots are readily eaten by stock, the plants must be protected by fencing.

Pampas Grass

Pampas grass is well adapted to provide low, dense shelter, and has the added advantage of requiring no trimming. Where winter or spring feed is scarce, stock may be allowed access to the hedge, which will again make sufficient growth to provide shelter during the coming winter. Well-rooted cuttings or one-year-old seedlings may be used, and can be planted out about 6 ft. apart in late July or August.

Unless some care is taken in preparing the ground, establishment is often poor, and this particularly applies where root cuttings which have been transported from a distance are used. Where time permits, the best results are obtained by planting one-year-old seedlings 1 ft. apart in a nursery, and transplanting them to well-prepared ground in the hedgerow the following year.

New Zealand Flax

New Zealand flax provides fairly effective low shelter for stock on soils where it grows well and where plants can be easily obtained. The plants may be set in continuous double rows spaced about 5 ft. each way, or simply planted in clumps in the corners of the fields. Only good, well-rooted fans from strong-growing plants should be used, and planting is best done in the spring, when the risk of heavy frost is over.

Stopping Ground Draughts

On many farms where single rows of macrocarpa or pines have been planted in the past, it is commonly found that increasing age combined with damage by stock causes the branches to die back near the base, resulting in severe ground draughts. Where the trees are still vigorous and appear capable of providing effective tall shelter for many years to come, the shelter may sometimes be greatly improved by planting a shade enduring species such as boxthorn, *Eleagnus* or *Pittosporum crassifolium*, according to local conditions, about 6 ft. out from the trunks. In the past, many farmers have attempted to use *lawsoniana* and *barberry* for this purpose, but as these do not so well endure shade, the results have usually proved disappointing. If necessary, any overhanging branches likely to have a smothering effect should be removed before planting.

Eleagnus, because of its ability to climb and also produce dense shelter, is probably the most suitable species for this purpose, particularly as it will grow well on either moist or fairly dry soil.

Home-growing of Seedlings

Nurserymen throughout the country carry excellent stocks of young trees, and can readily supply every variety suitable for the farmer's requirements. Where the numbers needed are small, it is usually most convenient to purchase supplies as they are required. If, however, a fairly extensive programme is contemplated and if time permits, it may well pay the farmer to grow his own trees. Pines, cypresses, and eucalypts can be raised from seed in the open, and species such as poplars. *Eleagnus*, seedless barberry, bamboo, pampas, and flax can readily be propagated from branch or root cuttings according to the species.

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Whether collecting seed or purchasing plants of any of the different species of pines or cypresses, it is important to pay close attention to the parent strains because of the wide diversity of good and bad types of these species. This is of special importance where the shelter is being planted round the homestead and is desired to have an ornamental value as well as to provide dense shelter.

When sowing in the open the seed may be sown from October to December, selecting light, clean, well-drained garden soil, and sowing in shallow trenches, covering each row with not more than ⅛ in. to ¼ in. of light, free soil. In dry weather some watering may be necessary. When the seed has been sown it should be protected from the sun and from birds by a covering of scrim or sufficient light branches to give adequate shade and to prevent the ground from drying out. Soaking or scalding is undesirable except for wattle, and if conditions are favourable the seeds will germinate within three to four weeks.

The percentage of germination is somewhat erratic, but under average conditions the following numbers of plants should be obtained from 1 lb. of seed of each species:—

Cup. lawsoniana: About 20,000 plants per 1 lb. of seed.

Cup. macrocarpa: About 5,000 plants per 1 lb. of seed.

Pinus radiata: About 10,000 plants per 1 lb. of seed.

Eucalypts vary from about 3,000 plants per lb. for *E. coriacea* and *E. pilularis* up to 15,000 for *E. eugenioides* and 30,000 for *E. viminalis* and *E. macarthurii*.

The young trees are usually transferred to nursery rows when about 6 in. high, where they are kept free from weed competition by hand-hoeing until the autumn of the second year after planting. In order to develop the growth of fibrous roots which will promote speedy establishment, the young plants should be "wrenched" with a sharp spade about six weeks before they are to be transferred to their permanent positions.

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Striking Cuttings

Where plants are being raised from cuttings it will be found that they strike best in light, well-drained soil. If cuttings are simply pushed into the ground from the surface the bark is apt to be skinned off, resulting in a poor strike. For this reason the ground should first be nicked open with a spade, the cuttings inserted against one side, and the other side pressed back firmly in position. If the soil is at all heavy a narrow trench should be prepared and the bottom covered with a layer of sand. The cuttings are then placed with their butts resting in this, and the soil is then returned and firmed back in position.

Planting Young Trees

The best time for planting operations depends very largely on the locality. Where the winters are mild, excellent results may be expected in late April or May. If severe frosts are likely, planting is best deferred to the spring. Only deciduous or very hardy species should be planted in the coldest winter months.

If possible, the ground should be prepared some months in advance either by cultivation or preparing the holes. A handful of equal parts of superphosphate and blood and bone applied to each tree greatly assists the establishment and early growth. When planting, take care that the roots are on no account permitted to dry out, and set each plant at its original depth. The ground should be well firmed around each plant, and the rows should be inspected from time to time so that any plants which may have been loosened by wind can be re-set.

Trimming of Hedges

The amount of trimming required for farm hedges depends very largely on the species and on the purpose for which it is grown.

Generally, a certain amount of trimming is desirable to encourage density and maintain an attractive shape or to curb excessive growth. Some species, such as gums, poplars, eleagnus, boxthorn, barberry, etc., can be drastically cut back without the slightest risk. Others, such as pines, macrocarpa, lawsoniana, benthamii, etc., are unable to refurnish new shoots from old wood and are also very liable to bleeding from cut surfaces, so that trimming or cutting back is liable to cause serious injury and must be performed with special care. Lawsoniana, benthamii and macrocarpa are frequently used as garden hedges. They must, however, be permitted to increase slightly in size each year and so are apt eventually to become very tall and rather wasteful of space. If well looked after, they do however provide very dense shelter. The trimming of these species is best performed in the dormant period, and preferably should be regular and comparatively light. When grown for field shelter, lawsoniana and benthamii are commonly left untrimmed.

Eleagnus, boxthorn and barberry benefit from light trimming until fully established. After this period they can be safely left without much attention for several years before being severely cut back, when new growth again sprouts from the old wood *Acacia verticillata, Hakea saligna* and *Hakea acicularis* are apt to become thin and bare unless kept well trimmed in the early years, and this no doubt largely explains why many hedges of these species eventually provide relatively poor shelter. If given a light trimming two or three times a year for the first few years after planting, however, more numerous branches are formed and this ultimately produces a much denser and far more satisfactory shelter.

Protection From Stock

The provision of good shelter makes fairly heavy demands on labour and money, and unless the work is carefully and methodically performed the results may prove disappointing. It is unfortunate that the most effective species of shelter plants require fencing, but this fact must be faced.

The advent of the electric fence offers excellent prospects of greatly reducing the cost of this item, and its economic use of wire is a particularly strong recommendation at the present time. The importance of allowing sufficient room between the plants and the wire is very frequently overlooked, and often explains why so many promising hedges quickly become bare at the bottom.

For low hedges (not stock-proof) deciduous species and lawsoniana, the distance from the fence should not be less than from 5 to 6 ft., while for the pines and the larger cypresses as much as 10 ft. is required for safety. If planted closer than these distances to save ground in the early stages of growth, the fence should be moved back later to provide room for full development.

In conclusion, the most serious mistake—and that which can most easily be avoided—lies in the selection of species unsuited for local conditions or for the purpose in view. In practice, the safest policy is to plant those species which are seen to succeed best under conditions similar to one's own, and if in doubt, to consult an experienced nurseryman who knows the district.

Acknowledgment

Acknowledgment is made to Massey Agricultural College for the following illustrations used in this article: Nos. 4, 5, 6, 7, 8.

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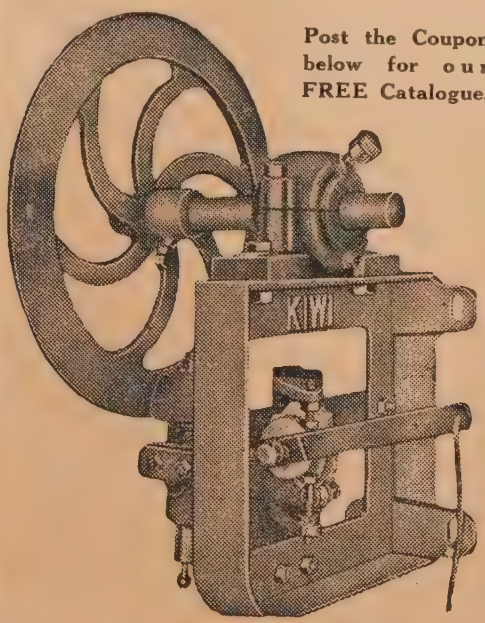

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WHEAT VARIETIES

A Summary of the Wheat Research Report on Wheat Varieties in the 1943 Harvest

— By—
J. H. CLARIDGE,
Seed Certification Officer,
Department of Agriculture, Wellington

Each year an analysis is made by the Wheat Research Institute of returns made by threshing mill owners relative to the acreages and quantities of wheat threshed from the previous season. The report, based on the analysis of returns of crops harvested in the 1943 season, is now to hand, and contains material of value to wheat-growers and of interest to all persons who appreciate the place of agriculture in a community. The following brief notes contain a summary of the report, together with the recommendations in regard to varieties to be grown in the main wheat-growing areas.

THE TOTAL area threshed in 1943 was 287,000 acres, as compared with 258,000 acres in 1942. The average yield per acre was 34.2 bushels—the highest since 1936, and 2.1 bushels above the mean yield of the last ten years. Cross 7 was the most widely grown variety with approximately 60% of the acreage, Tuscan being next with 24%, Hunters and Dreadnought each under 5%, and Fife Tuscan with a little over 3%. Tainui was grown in 2% of the area, and Jumbuck in 1%. Thirteen other varieties, each with less than one-half per cent of the acreage, comprised the balance of the area sown.

These figures indicate further increases in the areas allotted to both Cross 7 and Fife Tuscan and decreases in the areas of Tuscan, Hunters and Dreadnought. The lesser varieties show a further reduction in acreage compared with that of previous years.

NORTH ISLAND.

A phenomenal increase in the North Island acreage occurred in the 1942 sowings, which amounted to 14,500 acres. The figure is 8,000 acres in excess of the area harvested in 1942, and is the largest acreage grown during the past ten years. The average yield of 32½ bushels was somewhat below the mean of recent years. Cross 7 is the most important variety, closely followed by Tainui, with Jumbuck and Tuscan next, well down the list.

In the north-eastern and south-eastern counties of the North Island the sowing of Cross 7 as the main variety is recommended, with Tainui for use in late-spring sowings in the Wairarapa.

Tainui is recommended as the principal spring wheat for the West Coast counties, with Cross 7 for autumn sowing generally and for spring sowing on the heaviest land.

NELSON.

A very marked change-over from Major to Cross 7 has occurred with the 1942/43 crop, the latter variety now occupying over half the total acreage. Altogether, 1,400 acres of wheat were grown, with a yield of about 27 bushels per acre.

Cross 7 is considered more suitable for the earlier sowings in this district, with Major and Tainui for later sowings.

MARLBOROUGH.

Though the Marlborough acreage increased from 8,000 in the 1942 harvest to 13,000 in the 1943 harvest, the number of varieties fell from thirteen to eight. Cross 7 shows a marked increase to comprise almost 80% of the acreage, but all other varieties, except Fife Tuscan, have receded in favour. Jumbuck and Tuscan are the only other varieties of any moment. A general yield of 30 bushels per acre was experienced, there being very little difference in this respect between the main varieties.

Cross 7 is doubtless the most useful wheat for Marlborough, especially as Jumbuck is unsuitable for heading. On the light plains in the Marlborough county where Tuscan is largely grown, its replacement by Fife Tuscan should be considered as further seed supplies become available.

CANTERBURY AND NORTH OTAGO

This large wheat-growing district (the "granary" of New Zealand) wherein was grown last year 244,000 acres of wheat, may be divided into three main areas—

(a) Eastern portions of Rangiora and Eyre counties, Halswell and Ellesmere counties and the eastern portion of Geraldine county (known as "Hunters" counties).

(b) Waimate (south of Studholme) and Waitaki counties (known as "Dreadnought" counties).

(c) The balance of the area (known as "Tuscan" counties).

Hunters Counties

In these counties, where the Hunters variety comprises at least 30% of the crops, the total acreage grown last year amounted to 21,000 acres. The average yield in these counties was approximately 37 bushels per acre.

Cross 7 represented over 50%, Tuscan and Fife Tuscan together 23%, Hunters 22% and Dreadnought 2% of the total acreage.

Dreadnought has out-yielded all other varieties, but has shown no tendency to increase in area.

Dreadnought Counties

In these counties, Dreadnought has in past years been the most important variety, but the 1943 harvest reveals a strong swing to Cross 7 at the expense of both Dreadnought and Hunters, despite the heavier yield of both these varieties, particularly Dreadnought, compared with Cross 7. It would seem that many growers have been pre-

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pared to accept the lower yields associated with Cross 7 in order to gain the advantage of a variety which may be direct-headed.

Eighteen thousand acres, averaging 40 bushels per acre, were grown in this district, Dreadnought and Cross 7 being equally represented in 82% of the acreage, and Hunters the next in importance with 12%.

Tuscan Counties

In these counties, the three varieties, Tuscan, Cross 7 and Fife Tuscan, together comprise more than 70% of the crops of wheat.

In the 1942/43 season, 197,000 acres were grown, with an average yield of 33 bushels per acre. Fifty-nine per cent. of the area was sown to Cross 7, with Tuscan supplying 32%, Fife Tuscan 4%, Hunters 3%, Dreadnought 1½%, and other varieties negligible acreages. Cross 7 on the average yielded 5.8 bushels per acre better than Tuscan, the first-named variety being grown largely on the better class of land formerly devoted to the growing of Tuscan. For the first time, a sufficient acreage of Fife Tuscan has been grown for some opinion of its yielding ability to be formed. In this season, it has averaged about the same as Cross 7—34 bushels per acre, though presumably it has been grown on lighter land than has much of the Cross 7 area.

The recommendations for Canterbury and North Otago are:

For the lightest wheat-land Tuscan is the best standard variety, though Fife Tuscan, with a promise of a five to ten per cent. increase in yield, should be tried as soon as seed is available.

For what is regarded as medium to good Tuscan country and for the lighter type of Hunters country, Cross 7 should be grown. For the heaviest wheat-land Hunters is recommended, with Dreadnought as an alternative variety.

In the Dreadnought counties and in other odd localities where this variety is known to do well, Dreadnought is to be recommended, and in considering the desirability of changing over to the direct-heading variety, Cross 7, growers must keep in mind the reduced yield which can be expected from this variety.

CENTRAL AND SOUTH OTAGO AND SOUTHLAND.

This district, which contributed 14,000 acres to the Dominion's area of wheat, is, with over 90% of its area in Cross 7, more predominantly of this variety than is any other district. Yields have averaged over 40 bushels per acre, and in view of the very satisfactory nature of Cross 7 for the area, there seems no reason why any other variety should be grown there.

GENERAL.

Three matters of moment stand out in the report summarised above. There is the dominance shown by Cross 7 over all other varieties of wheat. This variety, originally produced at Lincoln College and later carried on by the Wheat Research Institute until its release in 1935, was considered to be a rather higher-quality wheat than Tuscan and to have greater resistance to lodging on the better Tuscan soils. Its phenomenal spread may largely be accounted for, however, by the fact that in addition to possessing the foregoing qualities, it has proven itself to be an ideal heading wheat, and has thus played a very prominent part in the introduction of header-harvesting to New Zealand.

Of minor note is the promise shown by Fife Tuscan in its initial season on anything like a commercial basis. This variety was raised by the Wheat Research Institute, and on account of its superior yield in trials, released to replace Tuscan on land at present being sown to that variety.

Then there is the trend being shown by growers to favour Cross 7 in those districts where non-heading wheats give greater yields. This trend may only be of a temporary nature, due to present labour difficulties, or it may be a real measure of the importance the farmer places on the advantages of the header-harvester in handling the wheat crop.

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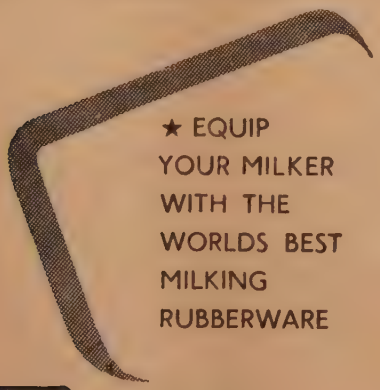
allow any part of the garden to be without a crop. If not planted with a vegetable crop, dig over and sow to a cover crop. When dug, the humus-content of the soil will be increased and depleted fertility restored.



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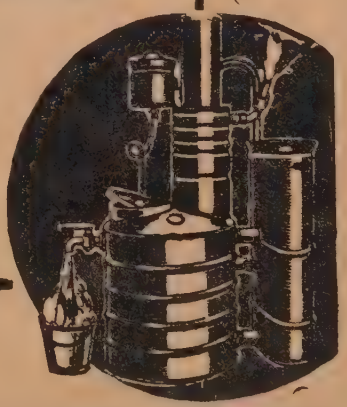

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Wheat Harvesting in the North Island with the Header Harvester

The use of the header harvester has developed rapidly in the past three seasons in the main wheat-growing districts of the North Island. Hitherto all wheat-crops were cut with the binder, and either stacked or threshed from the stook, the latter being the more general practice in Wairarapa and Hawkes Bay where drier conditions favoured that method. In the Manawatu and Rangitikei, the relatively uncertain weather made stacking more advisable, and experienced growers favoured this method in order to get grain with a satisfactory moisture-content.

— By —

C. J. HAMBLYN,
Fields Superintendent,
Palmerston North.

THE introduction of the header harvester during the past few seasons (last season practically all crops were handled by these machines) would appear to have coincided with particularly wet and difficult harvesting weather in the Rangitikei and Manawatu, and to a less extent in the Wairarapa. Wet weather in February and early March has been a severe test for the use of the header harvester, but contrary to the belief of many farmers used to the more costly reaper and binder and threshing from the stook or the stack, with its heavy demand for labour, there is sufficient evidence available for this statement:

With the header harvester properly used, milling quality wheat can be harvested under conditions in which it would be lost or spoilt for milling if the binder had been used when the wheat was ready for that machine.

When first introduced the header harvester was not used for direct heading, because of the idea that, if cut first and allowed to lie in swathes, better quality wheat could be threshed out by the use of the pick up attachment. This method is quite satisfactory in good harvesting weather, but is disastrous when showery weather or rain intervenes.

Better Left Standing

In wet or showery weather, the North Island wheat varieties, Tainui, Cross 7 and Jumbuck, will hold well until dead ripe—Tainui will hold until the straw breaks well after the dead-ripe stage—and the crop is far better standing than cut while awaiting more favourable conditions.

This fact is being slowly recognised, and it is certain that, as confidence is gained in the idea of leaving the crop standing, despite the weather, until those few odd fine days come along when it will dry out fit for harvesting, the direct heading of crops in such districts as the Rangitikei and the Manawatu will become general, rather than the exception it has been in the past.

Compared with wheat in the stook, and especially wheat cut and lying in the swathe, the standing crop will dry out and be fit for threshing in half the time it takes to dry out in the stook or the swathe. Another point, under really wet conditions much less harm will result from several days of rain with the standing crop, as compared with the stooked or mown crop, both of which will sprout much more than the standing crop.

Farmers used to cutting with the binder are reluctant to let a fine dry spell go by without cutting, but for the direct heading of wheat it is essential that the crop be practically ripe and the moisture content down to milling requirements. As already stated, the main wheat varieties of the Rangitikei and Manawatu will hold the grain until the correct stage is reached, and will stand a considerable amount of wetting and drying out without damage or loss of grain

Moisture Tests

Moisture tests in the standing crop when fully mature have shown remarkably speedy drying out after rain, and such crops are fit for threshing much sooner than are stooked or mown crops.

Experienced users of the header harvester, particularly with the varieties Tainui and Jumbuck, are becoming more and more emphatic that the only satisfactory method of harvesting with these machines is direct heading. The machines can harvest more per day than from the windrow. The standing crop is safer in bad weather awaiting good threshing conditions than the cut crop, and the standing crop will be ready for threshing much quicker after rain than the cut crop.

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Heading wheat in the North Island. The header is set lower than usual in order to save a quantity of straw.

A typical experience in the Rangitikei last season was as follows: Two paddocks of Tainui wheat on the same farm were ready to cut in early February. One was cut with the mower to be left several days for the pick up machine to thresh. A start was made with the second crop when rain stopped work. In the next four weeks there was continuous showery weather with some heavy rains interspersed with brief fine spells.

The cut crop sprouted badly and was finally threshed with a moisture content of 18% and was poor fowl wheat.

The standing crop showed discoloured husks and a little grain sprouted, but it was finally direct headed, in excellent harvest conditions about mid-March, and gave a yield of over 50 bushels per acre of fairly bright grain with a moisture content of 14%.

Summing Up

To sum up: In really good harvesting weather, and particularly in the Hawkes Bay and Wairarapa, there is no advantage in cutting the wheat crop for the pick-up machine to thresh, except for those varieties which shed badly in windy weather. When direct heading, the crops must be left later than when cut with the binder or mowing machine, but if the weather continues fine it will be ready to thresh not much later than if it had been cut, whereas if the weather breaks, the standing crop will go through with much less loss than the cut crops, and will dry out for direct heading in the next fine spell much quicker than the stooked or cut crop.

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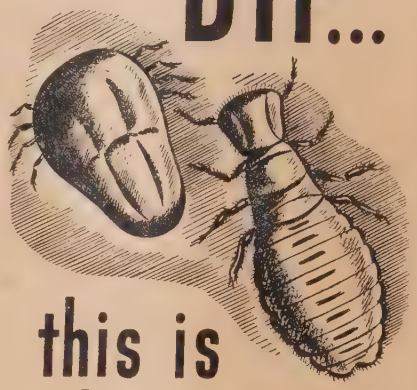

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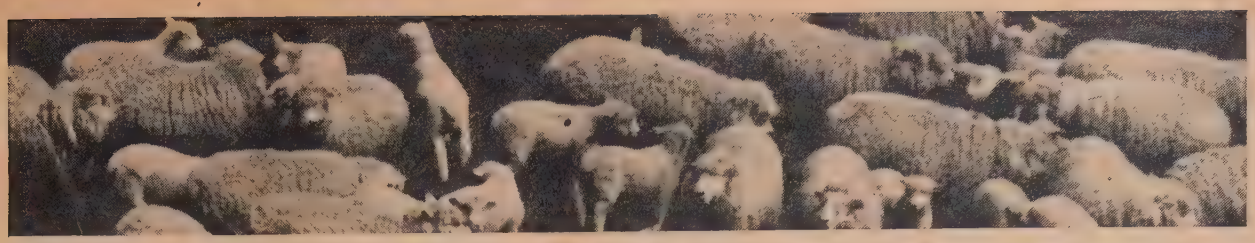

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Contributed by
The Livestock Division

WHILE THAT rather distressing complaint, contagious ophthalmia ("pink-eye") may appear at any season of the year, it is undoubtedly more prevalent in the late summer and autumn. Explanations sometimes put forward for this are based on suggestions that the disease is in some way due to the effects of pollen, or grass seed, or dust, or related to the absence of green feed at that period. While the true cause does not appear to have been determined with certainty, there seems little doubt that it is of the nature of a virus, and there is definite evidence that the disease is a contagious one and can be transmitted from sheep to sheep.

Spread by Contacts

The greater prevalence in the autumn is due to the greater opportunity for spread, through close contact of large numbers of sheep, often from different flocks, during ewe fairs, and their continued contact in yards, railway trucks, or large mobs which may be on the road for days. One outbreak seen in the depth of winter was actually at first thought to be related to the ensilage then being fed to the sheep, but further investigation indicated that its extensive appearance through the mob was due to close folding of hill sheep in a small paddock in which the ensilage was fed to them, and in which they tended to remain, thus giving an excellent opportunity for spread.

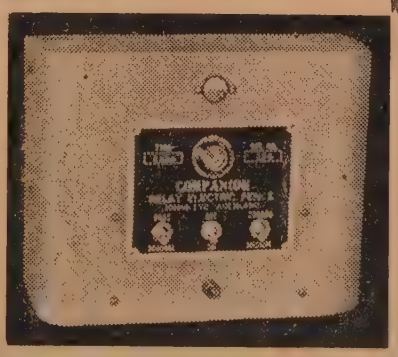
Probably carriers exist which carry the disease through from season to season. There appears no evidence that any immunity is set up. If so, it must be transient. Occasional outbreaks of a quite similar disease in cattle have been seen both in this country and in Britain.

A condition noted by sportsmen amongst the deer in northern parts of the South Island a few years ago, in which the animals were seen to remain in the same spot for days, slowly starving to death, or in which they fell from rocky heights and were killed in a manner most "undeerlike," was found by the sportsmen who recorded it to be due to some kind of blindness, no doubt a form of contagious ophthalmia. There is no indication that this, or the disease in cattle, is identical with that in sheep, or communicable to them.

Familiar Symptoms

The symptoms are familiar to most sheep men. One or both eyes may be affected. The affected eye is closed. Tears flow freely down the cheek. The inner lining of the lids is swollen, and protrudes between the edges, giving rise to the common name of pink eye. On examination the cornea or front clear transparent wall of the eyeball is seen to be opaque and "milky."

In more severe cases, ulceration, or even rupture, of the cornea may occur, though this is probably often due to violent collision with obstacles, such as posts, fences, or stumps, when the sheep is in rapid motion, in its partially, or completely, blind condition.



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Rupture of the eyeball will result in permanent loss of sight, but in uncomplicated cases, without rupture or serious ulceration, recovery is the rule, and the eyes clear up completely within three or four weeks.

Methods of Treatment

Treatment by daily instillations into the eye of a small amount of a 1 per cent. solution of zinc sulphate to which is added 2 or 3 drops of carbolic acid to each ounce, will undoubtedly aid recovery. It is laborious, however, and yarding the sheep for treatment is difficult with the ever-present risk of causing injury. In many cases, it is best to leave sheep quietly alone, preferably in a paddock free from ditches and obstacles, and with feed and water readily accessible.

Control methods are difficult to suggest, but the contagious nature of the disease indicates that, where practicable, affected sheep should be kept apart from the unaffected, and that newly purchased lines, especially from sales, and even rams from fairs, should not be introduced into clean flocks till they have been under observation for a week or more.

Blackleg

Blackleg in sheep, which has been recognised in New Zealand only in comparatively recent years, was fully described in this Journal in the issue of November, 1941. Whilst cases occur in lambs after docking, and in ewes after lambing, the type of case coming within the scope of these notes occurs after shearing, and after dipping. Blackleg in sheep appears to be always a wound infection, in this way differing from the condition in calves and young cattle.

Whilst many cases are found dead, some may be noted prior to death, showing lameness, fever, high temperature, and other signs of severe illness. If seen just after death, the characteristic swelling in the neighbourhood of a wound, with tenseness of the skin, and the presence of gas in the tissue may be noted. When cut into, the muscular tissue here is darker than that of other parts. General swelling-up of the carcase and putrifaction will commence fairly soon, however, and may mask these appearances.

Malignant oedema, also a wound infection, causes death under similar circumstances, and a bacteriological examination of specimens is necessary in order to decide which is present. Control of the disease during shearing operations will depend to some extent on cleanliness of holding yards and pens, and efficient dressing of any shear wounds. Vaccination is an effective preventive of blackleg, and should be given consideration where deaths from this cause occur year after year. Blackleg following dipping is dealt with under dipping losses.

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"Scabby Mouth"

Contagious ecthyma ("Scabby Mouth") is a contagious condition due to a virus, and may affect lambs or susceptible older sheep. One attack confers a lasting immunity, and vaccination of lambs, now extensively practised, is very effective in preventing it.

The first symptom is a swelling of the lips, followed by the appearance of an exudate which dries in the form of hard scabs. If these are removed, a raw, bleeding surface is exposed. There is usually some nasal discharge, and the nostrils are inflamed. In severe cases, the palate and tongue may be affected and show some ulceration, though this may be due to secondary infection by dirt germs. Sheep so affected will show considerable loss of condition, and this occurs to some degree in all cases, due to interference with feeding.

The disease is, therefore, of considerable economic importance and may delay the fattening of lambs or sheep for freezing purposes. Occasional mortalities from a form of septic pneumonia have been seen following ecthyma, evidently as a result of some of the accumulated debris around the nostrils being drawn into the lungs. Outbreaks have occasionally been mistakenly reported as facial eczema, but the ears in this condition are not involved, nor is there the violent itch or dread of the sunlight seen in eczema.

Treatments

A 1 per cent. solution of bluestone is a suitable remedy. The best way to apply it is to use a suitably shaped enamel jug or wide-mouthed jar, partly filled with the solution, and forcibly to immerse each sheep's nose in it for a few seconds.

Vaccination is an effective preventive. The vaccine prepared at the Animal Research Station, Wallaceville, is used with success, vaccination being conveniently carried out on lambs at marking time. The skin inside the flank is cleaned and lightly scratched, and the vaccine is applied with a brush. (See article by C. V. Days, District Superintendent, Dunedin, in the Journal of Agriculture, April, 1943, for full details.)

Dipping Losses

In the departmental booklet No. 181 on sheep dips, advice has been given, which, if observed, should prevent losses associated with dipping. As previously mentioned, some deaths following dipping have been found to be due to blackleg. This resulted from the infection of dogbite wounds. The blackleg organism was recovered from the contents of the dip in one instance.

Where large numbers of sheep have to be put through, and dipping occurs after wet weather, so that sheep pass through muddy yards, much contamination is unavoidably carried into the dip. Periodic clearing out of the dip becomes important. The occasional addition of a reliable antiseptic such as Kerol or Jeyes Fluid to the dipping fluid appeared to reduce the number of such cases in one flock. Dogs which are known to bite sheep during yarding should be tied up while dipping operations are in progress.

Pneumonia

Considerable losses from pneumonia due to chill may occur. These may be puzzling and hard to account for. Deaths may occur in one line and not in another. It will usually be found that one or more of the following conditions have occurred. The sheep—most often lambs—are well-woolled, thus taking longer to dry. They may have been dipped late in the afternoon, and may have been turned out after dipping into paddocks near the dip, where they start to feed without taking any exercise to warm them up. Such losses are unlikely in lambs which have to travel two or three miles after dipping to reach their paddocks.

Occasional deaths may occur through the entry of dip into the lungs. In the case of mature sheep,

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an animal may die three or four days later from a form of septic pneumonia. Weakly lambs, of course, may be drowned, and should be put through quietly, and singly, so that one lamb does not get on top of another and smother it. If necessary, they can be supported along the race dip, or helped out, by means of the crutch.

There is some evidence to indicate that death may, on occasion, result from the use of so-called non-poisonous dips, by the absorption through the skin of certain imperfectly emulsified fractions. In such cases, the deaths occur only among the first sheep to be put through the dip after a fresh mix, as they pick up the greater amount of the substances floating on the top. The risk can be lessened by thorough mixing just before the sheep enter. The drawing of a sack along the surface of the dip, after a new batch has been mixed, would remove a certain amount of the scum. Putting through a few old ewes before starting to dip valuable rams or lambs in a creosol dip is always a wise precaution.

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Apart, however, from differences in design, certain basic features are common to most ploughs, and the general principles of operation are the same.

This subject is fully discussed in bulletin No. 185, which is obtainable *free* from the Department of Agriculture, at Auckland, Wellington, Christchurch, Dunedin or Invercargill.

Care of Septic Tanks

IN REPLY to a correspondent who has written asking about the care of septic tanks, the Department of Health has supplied the following statement:—

"Assuming that all domestic wastewater is discharged into a tank, care should be taken to keep out disinfectants. Dishes should be thoroughly scraped before being washed up so as to prevent accumulation of grease in the tank. Toilet paper should be of the so-called 'soluble' variety. As long as a septic tank installation is giving satisfactory service, it should be left alone, but if it gives trouble at all the advice of the local health inspector or sanitary inspector should be obtained."

BE WARNED . . .

Facial Eczema Possible this Year

THE dry summer which is being experienced in most districts of the North Island has resulted in pasture drying off to an unusual extent, and the condition of paddocks, especially in the Waikato and South Auckland districts, is now very similar to that which preceded the severe outbreak of facial eczema in 1938. Although air temperatures have not been as high as in the summers of 1934-35 and 1937-38 they have been several degrees above normal in most districts, and this tendency has been even more pronounced in the case of soil temperatures. Should warm rains fall in sufficient quantities to cause a rapid flush of grass during February, March or April, facial eczema is almost certain to occur, especially in paddocks which are dry and bare. Cold rains, or rains followed by hot, dry weather are generally not so dangerous.

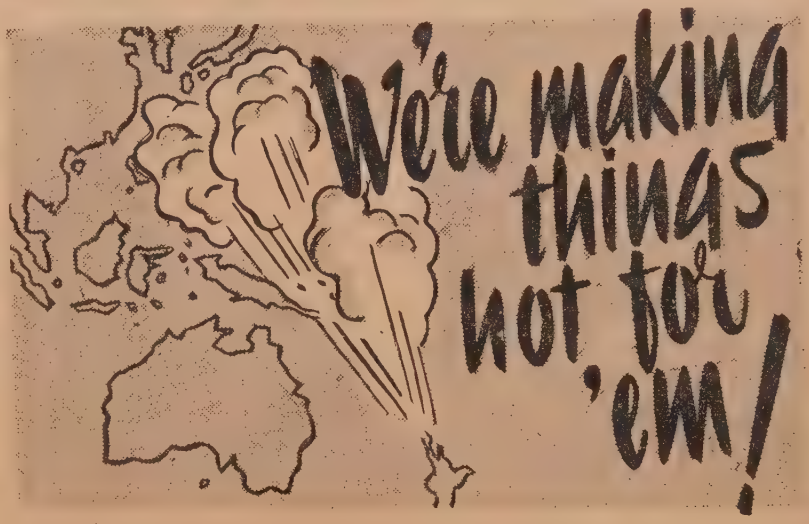
In view of the very severe loss which the disease can cause, stock owners should immediately make provision for preventive measures which must be taken promptly if they are to be effective. The important thing to remember is that facial eczema is caused by a poison which develops in the rapidly growing pasture which comes away during the first two or three weeks after rain. The consumption of this must be reduced to an absolute minimum. Each farmer must decide for himself how best this can be done, but he may be guided by the following general principles.

The most dangerous paddocks are those in which ryegrass and white clover are dominant, especially if they have been heavily stocked and eaten bare during the summer. Hill country carrying native pasture is generally safe, but slopes and gullies in which ryegrass is plentiful are often dangerous. Southern slopes are generally safer than northern slopes. Peat areas, especially those growing paspalum are relatively safe. The disease has never been reported on irrigated paddocks which have been kept green throughout the summer. Paddocks which were well covered with pasture before the rains are safer than bare paddocks.

In addition to the above, experience has shown that some areas on farms are safer than others, though the reason may not be obvious. If crops, such as maize, rape, pumpkins, lucerne or roots are available they should be utilised. Should no safe areas be available the intake of the dangerous pasture must be restricted by over-stocking small areas to such an extent that they are kept almost bare and supplementary feed should be provided. This will obviously mean loss in condition, and in the case of dairy cattle loss in production. To reduce this, feeding of some hay and/or silage should be commenced immediately so that stock may become used to it.

It is important to remember that it is too late to act after the first cases appear. Preventive measures must be taken immediately after sufficient warm rain falls to freshen the pasture and they should be continued for at least a fortnight. Pasture which grows after rain should not be considered safe until it has obviously hardened either as a result of hot dry weather or following a cold change.

In order to be prepared for prompt action if weather conditions render this necessary every stock owner in districts in which facial eczema occurs should decide at once exactly what he is going to do and make all necessary arrangements.



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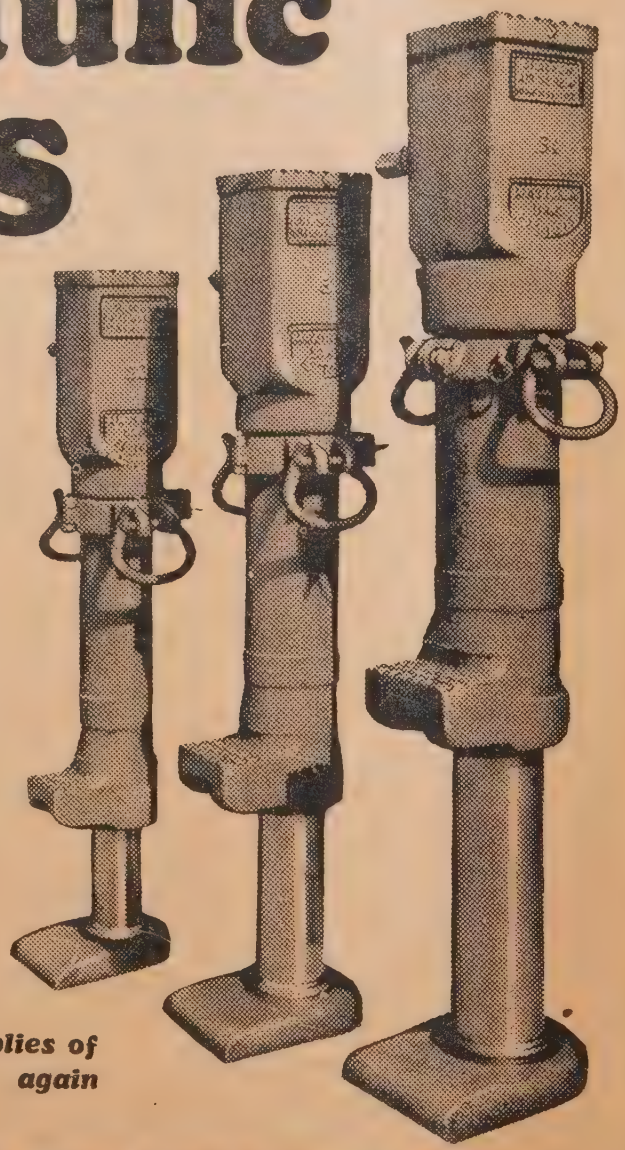

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Cultivation of the Chinese Gooseberry

The Chinese gooseberry, the fruit of a vine imported from China, is gaining increasing popularity in New Zealand, where, in most parts of the North Island, except the high country, the climatic conditions for its growth are satisfactory. In the South Island, too, the conditions are suitable in localities where damaging spring frosts do not occur. Although the plant can withstand heavy frosts in winter, it may suffer considerable harm from frosts in the growing season.

By F. SYDENHAM,
Assistant Horticulturist,
Wellington.
(On Active Service)

A portion of a Chinese gooseberry vine grown by the method described in this article. The fruit is large, and an abundant crop is produced. Note the mulch of fallen leaves which prevents the soiling of the fruit.—*F. Sydenham, Photo.*

KNOWN technically as *Actinidia chinensis*, the Chinese gooseberry occurs naturally as a deciduous fruiting vine growing to the height of 30 feet or more on the forest margins in China. It is a vigorous twining vine, and when cultivated on fertile land and given sufficient space, will assume large proportions if not controlled.

The plants are dioecious, i.e., the sexes are present on different plants. Not only is it essential to have plants of each sex, but they must flower at the same time. One male plant is generally sufficient for 5-10 female plants. The number depends on the method of planting which is described below.

Strain

As with most fruits, strain is of great importance. There is a considerable variation in type, as Fig. 2 shows. Strains are available which are definitely of inferior size. In shape, some are round, and some oval or elongated, while others have flat ends. Certain strains contain a fibrous core, and a few possess a hard, woody centre-piece, which is very sharp and resembles a toothpick or a fish bone. The colour of the flesh is generally an attractive shade of translucent green; but there are strains that are very pale, almost white in colour. The fruit, which matures during the winter months, is increasing in popularity; but any further planting for commercial purposes should be of the large oval, or elongated, green-fleshed type, with an entire absence of internal fibrous or woody material.

Climate

The plant is a native of China, and will stand quite heavy winter frosts; but frosts occurring during the growing season do a considerable amount of injury. If damaging frosts should occur when the new growth is put out, this growth is checked, and the small flower buds are destroyed. Unseasonable frosts occurring during the blossoming period (end of October and early November) reduce or prevent the setting of the fruit.

Climatic conditions are quite satisfactory in most parts of the North Island, an exception being the higher country. In the South Island, satisfactory production is obtainable where damaging spring frosts do not occur. Winter frosts in the localities where the plant can be grown do not appear to injure the fruit hanging on the vine. In such a position the fruit itself will stand 6 to 8 degrees of frost, and possibly more without harm. The flavour is definitely improved after frosts occur. The large leaves are not suited to wintry conditions. As a consequence, reasonable shelter is required.

The most suitable soil is a well-cultivated, deep, fertile loam, which is drained, but which retains the moisture during the summer. Wet soils must be avoided.

Propagation

The Chinese gooseberry grows readily from seed, but this method of propagation is not recommended. Too great a proportion of male plants is produced, and the variation in strain of the female plants produced is undesirable in a commercial production.

Grafting is the most satisfactory means, and the root graft method usually employed is not difficult even for amateurs. Sections of stock and scion of similar diameter should be united.

The female scions should be taken from a plant of the desired strain, and, if possible, worked into a piece of root of a female plant. The reason for the use of the female root is that if the graft failed, and the root developed growth, a female plant would result. The use of seedlings as stocks is not recommended, as they are very liable to break into growth below the union, when both male and female branches might occur on the same plant. This occurs frequently where the budding method of propagation is employed.

When grafting, a long union is preferred. This is tied with raffia and planted so that the union is covered with soil. Male and female plants should be kept separate. To avoid mistakes it is a wise plan to employ two different types of grafting. The tongue or whip graft (like placing two fingers together) may be used with female plants, and the cleft graft (like placing one finger between two others) for the male plants. These two types of graft are distinguishable for several years.

An effect of pruning on the quality of Chinese gooseberries. The fruit on the left (averaging 7 to the pound) is selected fruit from controlled vines, while that on the right is a sample taken from old vines grown over a pergola.—*F. Sydenham, Photo.*

Planting

When grown as a commercial crop the plants should be planted close to strong fences, 4 ft. 6 in. to 5 ft. high, with posts 15 to 20 ft. apart (according to the planting distances). Three wires, the lowest 18 in. from the ground and the others evenly spaced, should be used. Heavy wire is necessary, and No. 6 gauge is preferable to No. 8. The fences, which should run approximately north and south in order to obtain the maximum amount of light on both sides, should be spaced to permit efficient inter-cultivation and to allow room for handling the fruit during harvest. Ten feet is a suitable distance.

With fences higher than 5 ft. it is difficult to attend to the suppression of shoots during the summer, whereas with the pergola type of structure this summer pruning is impossible, and the dense shade provided by the top growth causes the death of much of the valuable lower wood. The growing of Chinese gooseberries on a tall fence and pergola, or over a shed, has nothing to recommend it. It leads to the ultimate production of inferior-sized fruit at a height where it is difficult to harvest.

Spacing of Plants

The plants should be spaced 12 to 20 ft. apart in the rows. Place the plants between the posts so that in subsequent years the posts will support the heavy weight of fruit on the extremities of the vines. The main branches will assist in supporting the fruit of the centre portion of the vine.

As male and female plants are required, and one male is sufficient for 5 to 10 females, the male plants should be arranged in the order that will afford the most efficient pollination, and at the same time make for the easiest and most efficient management of the plantation. It is the usual practice to space the male plants as evenly as possible over the whole area so that they are approximately the same distance apart, and so that they are surrounded by female plants.

An improvement on this method is the planting of male plants separately in rows throughout the plantation. As the male plants do not produce fruit, they do not require the same pruning and attention as the bearing plants. One row of male plants to five rows of females would be quite sufficient. In the male row, planting at double the spacing within the row, i.e., 30 to 40 ft. apart, would furnish the fence completely, and no female plants would be more than 30 ft. from male wood. At these planting distances, males 30 to 40 ft., and females 15 to 20 ft., 1 male is required for 10 females.

Wind Break

Where Chinese gooseberries are grown in an unsheltered position, rows of male plants may surround the plantation, and serve as a wind break. They might be allowed to grow to considerable size, being reduced, when necessary, by means of a slasher.

In smaller plantings it is satisfactory to plant only female plants, and to graft a male branch low down on the 4th or 5th female plants. This branch should then be trained on the bottom wire, say 18 in. to 2 ft. from the ground, and pruned so that it does not outgrow the female plant. These male branches should be identified so that they may be treated separately at pruning time, and may be allowed to extend as far as possible along the fence.

After Planting

Good plants firmly planted in fertile soil put out new leaders in the early summer, and so that these may be trained properly the fence should be erected before, or immediately after, planting. It is of great importance to furnish the fence from the bottom upwards, the first pair of leaders produced being trained to the lowest wire (18 in. to 2 ft. from the ground) on either side of the plant, and the second pair in a similar manner to the second wire (3 ft. 6 in. from the ground).

It should be sufficient to furnish the two lower wires in the first year, and if the tips of side branches are removed as they become about 12 in. long, the energy of the plant in the first year will be devoted to furnishing the lower wires. If the plants do well these leaders make 7 to 10 feet of growth, and those of adjacent plants will meet. In the second year, there will be little difficulty in furnishing the third and top wire. During the second year, much lateral growth will develop from the previous year's wood. This should be cut back to about 12 in., and subsequent shoots also shortened.

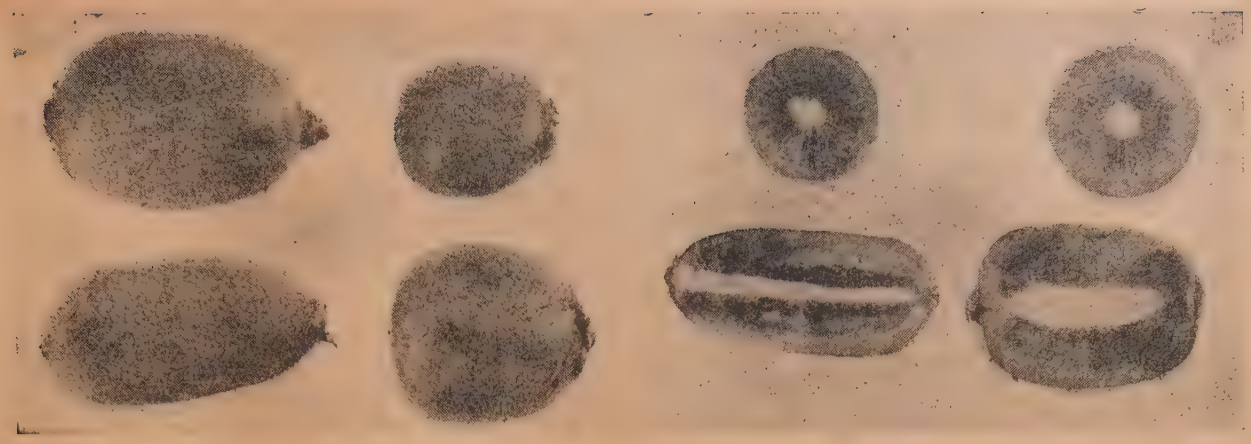
Pruning and Training

To furnish a fence properly requires close attention in the early years, the benefits of which will be appreciated in later years when the plants come into bearing. During the second and third years, constant attention to pruning and training is required, as the available sap-supply is used for growth. When, however, the female vines are in heavy bearing, so much of the sap is required in developing the fruit that only a little growth is put out.

On the low fence it is not difficult to keep this in check. With the male plant the position is different. As no fruit is produced all the sap goes into growth, which requires a considerable reduction, especially in the winter. The wisdom of planting the male plants separately will be apparent. In such a position an occasional summer pruning may be given. When the plants are grown together on a common stock, both male and female plants should receive the same attention.

Mature Plants

Both summer and winter pruning is necessary, and in many ways the Chinese gooseberry resembles the grape-vine. In the spring, growth is put out from dormant buds, and on this new growth the fruit develops. Where vigorous growth is put out, it



Types of Chinese Gooseberries. The two fruits on extreme left are of excellent type. Of the next two the lower one has flat ends which necessitate much waste in peeling, while that above it is too small. The two good fruits are shown in longitudinal and cross section. The conspicuous "core" in these fruits is soft and tender.—*H. Drake, Photo.*

is advisable to stop it several leaves beyond the last fruit. Where less vigorous growth is made, there is no need for such stopping back. All vigorous, non-fruiting growth made during the growing season should be cut back or removed entirely where it is not required to form fruiting wood or leaders. By this means, the shading of the lower branches, and the consequent death of many laterals, is avoided.

During the winter, the fruiting wood generally requires a considerable amount of thinning out. It is not cut back, as are grapes, to rods, but should be thinned out in much the same way as the spur and lateral wood of apple trees.

Better Fruit

This results in the production of fewer but larger fruits. There is a demand for quality fruit, and this can be obtained only where the plants are controlled.

On plants which are allowed to grow unchecked, fruit of good size will be produced for a few years, but as the size of the plant increases and the fruit develops at a distance from the sap supply, the fruit will become smaller. Fig. 4 gives a comparison of the types of fruit produced by pruned and unpruned vines of the same strain. The larger specimens, averaging seven to the pound, were selected from controlled vines, whereas the smaller specimens were a fair sample from an uncontrolled plantation. A great proportion of fruit weighing 7 to 10 to the pound is not difficult to obtain under the system of pruning described.

Note: The winter pruning should be done in July after harvesting the crop, and when the plant is dormant. If it is left till late winter or early spring, sap exudes from the cuts made, and may cause a considerable loss of valuable wood through its dying back.

Manuring

Mature plants, to obtain high production, will require fairly heavy manuring. About 6 lb. of blood and bone per plant (1 ton per acre) in the late winter, and 1 lb. sulphate of ammonia or dried blood per plant (3 cwt. per acre) at flowering time should give satisfactory results. These amounts should be used when the plants are in heavy bearing.

A cover crop sown with a light dusting of super in the autumn does not interfere seriously with picking, and may be worked under early in the spring.

If young plants are used, and they make good growth, it is possible that a few fruits will develop in the second year on the two lower branches. In the third year, the production will be greater. Heavy yields are obtained from the fourth year onwards. The profitable life of the vine is not known, but it is likely to be at least 20 years.

As the crop is not grown extensively and few records are kept, a figure for production is not easy to obtain. The produce of one plant in its fifth year at Tauranga weighed 200 lb.

Harvesting

The vines bloom early in November. The fruit develops rapidly, and growth is completed about the middle of May. During the month of June, the fruit is quite firm and high in pectin, at which stage it is useful for preserving. Early in July, it begins to ripen, when much of its pectin content is lost. It then becomes a dessert fruit. It is necessary to pick the crop early in July, as it is readily taken by small birds if allowed to ripen on the vines. It is best picked after being frosted and after all the leaves have fallen.

After picking, the fruit may be stored in a cool, draught-proof store (to prevent withering) and marketed before it becomes soft. It should be possible to keep a quantity of it till August or September, when better prices will be obtained on the market.

The fruit should be graded and packed in 20 lb. boxes.

There are no records of any specific disease attacking the Chinese gooseberry in New Zealand.

Radio Broadcasts

ARRANGEMENTS have again been made for radio talks to farmers to be delivered from Station 1YA, Auckland, at 7.15 p.m. on each Monday as from March 13. The programme for March is:—

March 13.—"How the Fields Division Helps the Farmer," by P. W. Smallfield, Director, Fields Division, Department of Agriculture, Wellington.

March 20.—"Field Work for the Coming Month," by P. S. Syme, Instructor in Agriculture, Department of Agriculture, Warkworth.

March 27.—"Young Farmers' Clubs' Session," by T. E. Streeter, Dominion President, Young Farmers' Clubs' Federation.

Internal Parasites

Much concern is felt in farming circles because of the serious annual losses among sheep and calves due to the ravages of internal parasites. A bulletin has been prepared to cover all aspects of this problem, including short descriptions of the various common parasites encountered, and a summary of the methods of treatment available to the farmer. This bulletin, No. 171, is obtainable **free** from the Department of Agriculture at Auckland, Wellington Christchurch and Dunedin.

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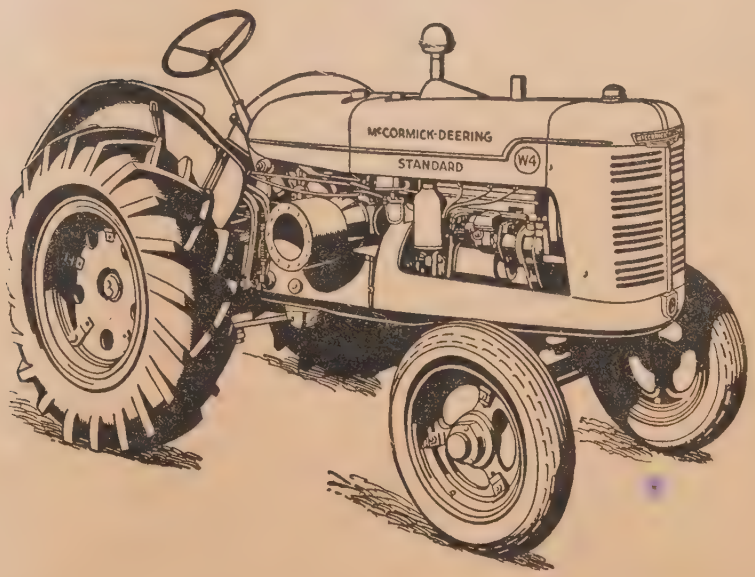

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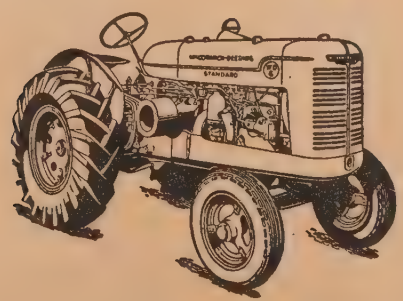

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Instructor in Agriculture, discusses

The Establishment of Pastures on Better-Class Wheat-Lands of Ashburton County

Farms on which cash crops, such as wheat, oats, peas and barley, provide a fairly substantial portion of the income, are an important section of Ashburton County. They occupy most of the high producing, heavy and heavy-to-medium land, of which there are some 230,000 acres, commonly referred to as cropping or wheat country. The establishment of pastures on this class of land will be discussed in this article.

WITH the wide range of soil types through the Ashburton County and the pronounced variation in climatic conditions, it is natural to expect the farming systems to vary to a marked degree.

The farmer usually relies on one particular commodity to provide him with a substantial portion of his income. It may be butterfat, fat lamb, fat cattle, wool or some crop and in the case of many farmers in the Ashburton County, on the good land, it is wheat. Around this crop, he may produce fat lamb and wool, and, in addition, may grow peas, barley, oats, potatoes or small seeds to augment—in many cases to a considerable extent—the returns received from the production of wheat.

Production of Grass

The arable farmer on this class of country is a mixed farmer in the true sense of the word, and whether the returns from crops exceed those from livestock and other grass products will depend largely on the class of country and the locality. Whatever the position, however, the production of grass must be an integral part of the farming operations.

In the case of the arable farmer, his energies are not entirely devoted to grass; he is chiefly concerned with the production of wheat, oats, peas, potatoes and other crops. His pastures provide only portion of his income, and consequently receive only a corresponding portion of his time and attention. It must not be inferred, however, that the good arable-farmer neglects his pastures. The quality and number of fat lambs produced in the county is sufficient indication of the productive capacity of the pastures. Nevertheless, it will be agreed that there is room for considerable improvement in some pastures.

The questions now arise: What is wrong with these pastures? Can their faults be eliminated economically, and can improvements be made without unduly sacrificing or reducing the returns normally obtained from crops?

Some of the main faults are the lack of a balanced mixture of grasses and clovers, the presence of weed-growth, and the lack of density or body. The pastures are inclined to be too thin and open. There is also a distinct tendency for their productive life to be too short. They are inclined to revert too rapidly to weed-growth and inferior grasses.

No Easy Matter

Overcoming these pasture deficiencies is undoubtedly no easy matter. There are two very real problems to contend with—problems over which the farmer has no control—namely, climatic conditions and the ravages of the grass grub (*Odontria*) and of the subterranean grass caterpillar (*Oxycanus cervinata*), also called Porina.

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Undoubtedly, the climate of Mid-Canterbury, with its uneven rainfall and drying winds, does restrict grass growth. It also limits the response which may be obtained from any special treatment the pasture may receive. It will be agreed, however, that whilst climatic conditions limit grass production, they do not do so to the extent that no endeavour should be made to improve their carrying capacity, with indirect benefit to following crops when the paddocks are again broken up. The better treatment a pasture receives, the better it is able to withstand unfavourable climatic conditions that may arise.

Problem to be Faced

Damage caused by the grass grub and the subterranean grass caterpillar is certainly very disheartening, but it is a problem in grassland management which must be faced and accepted. In any case, it is doubtful if the damage on wheat-growing land is sufficiently extensive to deter farmers who wish to concentrate on pasture improvement.

Excluding weather conditions, perhaps the main factor responsible for the general weakness in Ashburton county pastures is the fact that most of them are sown down with a cover crop. It may be one of the cereals—wheat, oats or barley, or it may be rape or turnips. Probably the majority of the pastures are established with wheat as a cover crop, the grass-mixture being sown in the spring on autumn-sown wheat. This practice has the advantage that it is a cheap and easy method of establishing grass, and, further, it enables the farmer to plan a rotation with the minimum of cultivation.

This pasture was sown on a fallowed surface that had received an application of lime. Note the dense sward of ryegrass and white clover.

Difficulties Encountered

It must be admitted that some good pastures are established in this manner; but in general the practice produces unsatisfactory results. With wheat sown in May or June, the difficulty often is to obtain a satisfactory tilth for small seeds in September, particularly if a wet winter is experienced. The result is often an unsatisfactory strike, either of grass or clover, or both. The competition from the cover crop also tends to weaken the stand, so that when the crop is harvested the carrying capacity of the

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area is often fairly light until well into the following spring.

A poor strike or weak growth generally results in weed-growth gaining access to the sward. It may thus happen that any advantage gained by cheapening the cost of establishment of the pasture is offset by reduced carrying capacity. With a spring-sown crop, such as oats or barley, the prospects of a good establishment of grass are improved, as the seed is sown in a newly cultivated seed bed; but even so the competition from the cover crop often results in an indifferent strike of grass, although it must be said that the cover crop does tend to minimise weed growth on areas where spring weeds are prevalent.

Again, many pastures are sown down with turnips, and if wet conditions prevail during the winter whilst the turnips are being fed off, much of the grass often gets trampled into the ground, resulting in a thin and weakened pasture.

Section of pasture-growth typical of the growth on many pastures sown down with wheat as a cover crop. The sward is inclined to be open, and lacks a balanced mixture of ryegrass and clover. This photograph was taken 12 months after the sowing down.

Necessary Step

The first step necessary to effect a general improvement in pastures in the Ashburton county is an endeavour to establish them wherever possible in the absence of a cover crop. The value of this method of pasture establishment has been well demonstrated on various farms in this country, where some of the best grass paddocks have been obtained by sowing after a fallow and without any cover crop. In one instance, a farmer who has been establishing his pastures in this manner has made very considerable improvement in the stock-carrying capacity of his farm. He is convinced that he is also obtaining better results from his crops, due to the benefit to the soil from having carried a good pasture instead of a poor one.

To do this involves a change in the farmer's normal cropping rotation and also additional cultivation. There must be a gradual process that will not unduly affect the normal carrying capacity of the farm. What makes the position somewhat difficult is the fact that cereals and peas are usually harvested in February or thereabouts, and by the time harvesting is completed, and the ground cultivated for sowing, it is usually well on in March, or even April, which is rather late for sowing pastures, particularly for a satisfactory strike of clovers.

Rotation

The farmer has therefore to find some suitable crop to sow after harvest so that his pasture can be sown at the most opportune time. The re-arranging of the rotation to enable some pastures to be sown without a cover crop would, no doubt, vary on individual farms, according to the locality, size of the farm and the usual rotation practised. Some of the wheat stubble in the autumn, for example, could be put into green feed-oats and sown down to pasture in the following January or the area might be winter-fallowed and sown down to pasture in the spring.

After a turnip crop, the land could be fallowed and sown down to pasture in the early summer, i.e., November,

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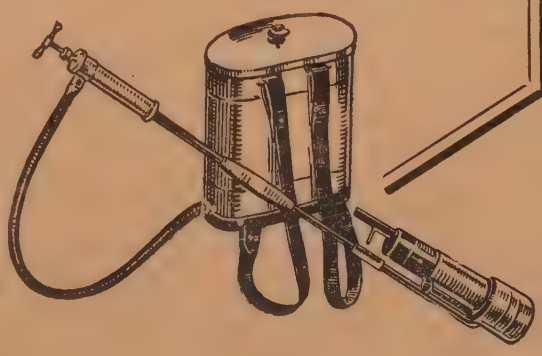

instead of the pasture being sown down with the turnips or with a cereal crop after the turnips had been fed off. Later summer or autumn sowing may be advisable to minimise trouble from fat hen or yarr.

If good pasture establishment is to be obtained it is also desirable that the land should be well fallowed before sowing. Most arable farmers are prepared to fallow their ground for wheat, peas or any of the other farm crops; but for some reason or another many are reluctant to fallow ground before sowing it down in pasture. If it is consdered essential to fallow ground to produce, say, a good crop of wheat, it would appear equally essential to fallow the land to obtain a good pasture.

A Quick Start

Sowing on well-fallowed ground usually results in rapid germination, and a good, quick start in the life of a pasture often means the difference between success and failure. A good dressing of lime is also desirable on the fallowed ground before sowing. Experience indicates that liming definitely enhances the prospects of obtaining a good, vigorous growth of clovers.

It is not intended to reiterate the advantages of sowing seed of known origin and quality, but it is desired to stress the importance of including in the pasture-mixture a pound or two of certified white clover. Many farmers are under the impression that if their land already contains ordinary volunteer white clover there is no necessity to sow the certified type. This assumption has proved to be wrong. The certified strain will not only provide a greater bulk of feed, but will also form a valuable component of the pasture sooner after sowing, and better able to withstand adverse weather.

On Wheat Lands

Many of the pastures on the wheat lands of the Ashburton county are of an indifferent type. The production of wheat over a long period of years is responsible in some measure for this, but present methods of establishment and maintenance of pasture also have an important bearing. The farmer who is busy preparing his ground for wheat, peas, potatoes and other crops, and whose pastures may be subjected to unfavourable weather conditions or attack by grass grub, perhaps does not consider that special attention to the improvement of his pastures is warranted.

Is this view a correct one? Pasture improvement necessitates the establishment of more pastures in the absence of cover crops. It is not suggested that a farmer can establish all his pastures in this manner, but most farmers can arrange for some of their paddocks to be sown down pure.

Pasture improvement also necessitates the establishment of pastures on fallowed ground. Many farmers are prepared to fallow a paddock for 5 or 6 months preparatory to sowing a crop of wheat. How many farmers are prepared to fallow a paddock for a similar period before sowing down to grass? Better pastures mean higher stock-carrying capacity.

Experience in this county has shown that farmers who concentrate on the establishment and maintenance of good pastures automatically produce good crops.

Orchard Diseases

THE results of investigations carried out by the Plant Diseases Division are embodied in the Department's **free** bulletin No. 161. This bulletin deals with the various sprays in common use, their dilution and combination, and sets out spray schedules for apples, pears, stone-fruits and citrus fruits. The treatment and disinfection of tree wounds is also explained. A copy of this informative **free** bulletin may be obtained from the Department of Agriculture at Auckland, Wellington, Christchurch and Dunedin.

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PRUNING OF CITRUS TREES

There is a common belief that evergreen trees require no pruning, and many commercial citrus growers have adopted this principle. The result has been the rapid decline of many citrus trees soon after they have reached maturity. The period of maximum fruitfulness is not maintained, and this is a national economic loss.

If it is admitted that air and sunlight are essential for deciduous trees for the development of shoots, buds and fruits in a healthy manner, how much more necessary will it be for trees which naturally shut out these requirements? Attacked by fungous diseases and insect pests, with limbs dying through an infestation of citrus borer, and with crossing branches and thorny suckers, the neglected citrus tree is one that no grower would defend, but the degree of pruning to offset these difficulties is much debated. However, there is no other key to success but regular and moderate pruning. In this article the author deals with the pruning of all citrus trees with the exception of lemon trees.

— By —
A. M. W. GREIG,
Citriculturist, Wellington.

THE objects of pruning citrus trees are practically identical with the objects of pruning all fruit trees, namely:

1. To obtain regular crops of good-quality fruit of adequate quantity.
2. To maintain a strong framework capable of carrying large crops.
3. To maintain thrifty, fruiting wood throughout the tree by admitting adequate air and sunlight.
4. To remove all crossing branches apt to cause rubbing and so weaken main limbs.
5. To remove all dead, dying and diseased limbs.
6. To permit adequate spray coverage.
7. To control the height of trees in order to permit harvesting of crops as much as possible from ground level.
8. To encourage the horizontal, fruitful branch, and to discourage the vigorous, upright branch.

Equipment

Pruning equipment consists of a pair of strong, sharp secateurs which will make a clean cut close up to the limb which is being retained; a well-set pruning saw, preferably the curved type, which can be inserted into many parts of the tree where the straight type cannot penetrate; a sharp knife for trimming pruned edges; and a tin of bitumen wound-paint for painting wounds over 1 inch in diameter.

The system of pruning is closely related to general cultural practices, chiefly the manurial programme. Light manuring and regular pruning should give a better type of citrus fruit in colour, texture and keeping qualities than heavy manuring and inadequate pruning. On the other hand, manuring should be temporarily reduced after heavy pruning, or the resultant crop will tend to be large, coarse, and of poor keeping-qualities. By carefully regulating the quantity and kind of manures applied, a thrifty condition can be most economically maintained.

Pruning in Nursery

As with all other kinds of fruit trees, citrus trees must be raised on a sound foundation, which necessitates careful selection of site, soil and climatic conditions. Trees should also be worked on to the rootstock most suited to the conditions chosen.

For most citrus localities, the sweet orange (*Citrus sinensis*) is the most suitable rootstock for sweet oranges, New Zealand grapefruit and lemons. The rough lemon (*Citrus limonia*), commonly called Citronelle, is suitable for lemons, and only for sweet oranges and New Zealand grapefruit when grown on heavier and richer types of soil. The trifoliate orange (*Poncirus trifoliata*) should be reserved for heavier soils in colder districts and for domestic orchards where smaller trees, bearing good quality fruits, are desired.

To obtain the best results it is essential to choose budwood from specially tested trees which have records for quality and quantity. Budding should be done only to the most vigorous of the rootstock seedlings, and should be done by the upright T method when the sap is flowing freely in the period from November to March each year, the bud being inserted at least 6 inches above ground level.

The bud should be permitted to make a good strong shoot growth, and then it should be pinched at 18 inches above the bud-union, in order that it may throw out three or four shoots, which should be utilised as the main framework branches of the tree.

If trees are purchased in poor condition, such as branching practically at ground level, or with weak stems, no systematic or adequate pruning will ever satisfactorily overcome inherent defects in the original trees.

The rootstock seedlings and budded trees should be grown without check in the nursery, and only the strongest and healthiest trees retained for planting out in the commercial orchard. A weak or stunted tree always remains inferior to a strong normal tree under equal conditions.

At Time of Planting

This pruning will depend upon the condition of the tree at the time of planting. The chief essential is to retain a balance between the root system and the foliage system of the tree. If the roots have been severely pruned prior to lifting, the shoots should also be severely pruned to an outside bud, even if such pruning entails the removal of all foliage. The reason for this action is that the pruned roots are unable to draw up sufficient water to retain the sturdiness of the top by replacing the water lost through the leaves by transpiration. If the roots have been kept intact and balled, the tree may require no pruning at the time of planting.

It is always a wise precaution when planting citrus trees to examine the bud-union and make sure that the top of the rootstock has been pruned off cleanly so that no stub remains, as this will die back and cause a point of weakness liable to the attack of fungous diseases.

Non-Bearing Trees

For the first five years from the time of planting, all citrus trees are at the vegetative stage, and this vigorous growth should be encouraged and directed rather than suppressed, thus the pruning required will be the minimum.

It sometimes happens that the upper portion of the newly-planted tree makes no growth, while from near the base of the stem, healthy, vigorous shoots arise during the first year. If these are above the bud-union, the whole of the former main stem should be pruned back to the point where the vigorous shoots arise, and one of these shoots should be retained to form the main trunk of the tree. This should be pinched at 18 inches above

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the bud-union to form a new head, but this procedure is only required when the original tree has made no growth.

During the first five years, the foundation must be laid for a good, strong framework, which, when the tree begins bearing, will be able to carry heavy crops of clean fruit.

Choose three or four main branches, pointing away from each other, for leaders. At the point where the main trunk forks and the three or four leaders arise, remove all other shoots so that the union is kept entirely free from secondary growth. In early spring each year, inspect each tree, and thin out the central growth, removing any crossing branches. No crossing branch should ever be retained in the early years.

Regularly inspect young citrus trees during the growing seasons and rub off all water shoots developing on the main trunk. This will generally require a monthly inspection in spring and autumn.

From 5 to 10 Years

During the period from five to ten years from the date of planting, a tree should gradually change from the vegetative to the reproductive stage.

This will be observed by vertical growth setting fruit and gradually bending towards the horizontal and developing fruiting laterals. The maintenance of the reproductive stage is naturally the object of every citrus grower.

During this period, also, the growth characteristics of the different species of citrus become more manifest. It is therefore necessary to subdivide the genus into the pruning of the lemon, the pruning of the New Zealand grapefruit, Poorman and sweet orange, and the pruning of the mandarin.

The pruning of the sweet orange, Poorman and New Zealand grapefruit during the early years of bearing is practically identical; therefore the term orange will be used to refer to each of them.

The time to prune the orange tree is more clearly defined than that for the lemon, as the orange bears a definite annual crop, and pruning should be undertaken as soon as this crop is harvested.

The orange naturally forms a better shaped tree than the lemon, but most of the main principles governing the pruning of the one apply to the other. Sucker growth is less apparent, but should be similarly treated. The centre should be kept open, and thinning practised. The orange tree, unlike the lemon which bears on laterals or horizontal limbs, produces its fruit on the terminal twigs of the current season's growth. To maintain fruitfulness, the tree must be kept growing steadily, and the annual wood-growth must be properly ripened. This is governed largely by pruning, and an annual thinning is therefore necessary. This consists of cutting away the shoot that has fruited and saving those arising from its base, thus thinning and shortening. By this method the tree continues to bear its crop on the outside of the tree and, whilst making a necessary annual increase in circumference, makes it less rapidly than when no pruning is done. Dead or declining wood must never be tolerated in an orange tree. Such growth should be pruned to a good healthy side shoot.

Mandarins

The pruning of the mandarin is similar to that of the orange, but more severe. The dense manner of growth of mandarins so weakens the massed twigs that, unless thinning is done, only weak growth remains. This is capable of carrying only small, inferior fruits, and the lack of pruning often results in mandarin trees becoming completely barren. The system of pruning must be varied somewhat, according to growth form. Mandarins of the Japanese or "Thorny" type, with a spreading habit, require to be made more erect by pruning to an upper shoot. Mandarins of the more erect form, such as the Emperor type, require to be pruned to induce the spreading of the branches.

Mature Bearing Trees

If the procedure outlined for the first 10 years of a citrus tree's life in an orchard has been adopted, the maintenance of such a tree in a thrifty condition is relatively easy compared with that of the unpruned tree. Regular annual thinning should be continued, and care exercised when picking to remove declining fruiting wood. Removal of the lowest branches often becomes necessary at this stage, and the thinning out of horizontal branches should be continued.

Too often, little or no pruning has been done to a citrus tree. In such a case the following procedure should be adopted. Commence the pruning at the base and work up. First remove any branches which are too low, so that there is a 2 ft. space in height from ground level to lowest horizontal branches, all round the tree. This enables the pruner to get in close to the trunk of the tree for further operations. Then prune off any shoots on the main trunk below the fork, and open up the fork so that one can climb into the centre of the tree. This should be followed by the complete removal of a few of the most central vertical branches and any crossing branches. This will probably be sufficient for the first year's operations on all trees in the orchard.

A year later continue by more general thinning of horizontal and vertical branches, and in the third year complete the process by a general overhaul and removal of all weak growth and the thinning of new shoots which have arisen since previous operations. Where large wounds have been made by the removal of limbs, trim the edges of the wound with a sharp knife and paint over with bitumen wound paint.

Rejuvenation of old citrus trees is practically identical with the above procedure, and if trees have been regularly pruned, rejuvenation is not necessary for many years. When required, on well-pruned trees, it will consist of a shortening back of leaders and laterals in order to throw the tree into the vegetative stage once more and induce a fresh development of foliage and later fruit.

Frosted Trees

The pruning of frost-damaged trees presents a special problem. Trees should not be touched until late spring, when all risks of further frosts are over. All the trees should then be given a thorough overhaul as outlined in the procedure for annual pruning, shortening back the wood to healthy tissue. If this work is done between October and December, trees readily respond, and the resulting new growth should be sufficiently mature before the onset of the winter following the frost injury. No drastic pruning is advisable after February-March, as the resultant autumn growth will be too immature, and thus subject to frost injury that winter. If pruning is done earlier, growth should have had time to harden before winter.

Prevention of Disease

Where brown-rot (*Phytophthora citropthora*) appears in a citrus grove, it is necessary to prune trees three feet clear of the ground in order to prevent the spores of this fungus being splashed on to the trees and causing infection. In the case of the dicky-rice-weevil (*Maleuterpes spinipes*) trees should be pruned at least 1 ft. clear of the ground to prevent any weevils gaining access to the tree. Generally speaking, there is no necessity to prune trees clearer from the ground than is required for the operator to hoe, mulch, disc or plough the orchard in an economic manner.

An instance of pruning as a result of certain diseases is the "bare-pole" system. By "bare-poleing" is meant the hard cutting-back of leaders and laterals, retaining only the framework of the tree and removing all stems, leaves, twigs and thorns containing chlorophyll. All the larger cuts should be trimmed with a sharp knife and painted with a bitumen wound paint. Such drastic pruning is best done between October and De-

cember. The trees will take two or three years before fruiting well and being clothed with foliage, but dormant buds on long bare stems will break out and devolop into useful lateral growth. This new growth requires to be spaced out by rubbing off a proportion of these shoots, retaining only a sufficient number to refurnish the tree with well-spaced fruiting laterals.

Another instance of tree surgery necessary because of disease is when a tree is infected with bark-blotch (*Ascochyta corticola*) or collar-rot, associated with *Fusarium limonis*. All visible sources of infection must be removed with a chisel or sharp knife, and the area painted with acidulated mercuric chloride (1-1000) and then painted with bitumen paint. A close watch should be kept on these wounds for citrus-borer.

Disposal of Prunings

In order to maintain orchard hygiene, all citrus prunings should be gathered together and burnt as soon as possible after the work is completed. This is, of course, imperative when such prunings are diseased. It is better to keep a fire going and burn prunings daily; otherwise the orchard is apt to become full of old prunings, often left too long and worked into the soil at the time of cultivation. The ash from the burnt prunings is of value, and should be spread, whilst dry, as a fertiliser around the citrus trees in rotation. It is often better to retain a few spaces in a grove for the burning of prunings than to have to drag all such material out of an orchard.

During the vegetative stage in the life of a citrus tree, it is advisable to keep digging around the trees and endeavouring to suppress the formation of large roots close to the surface. Later, hoeing is sufficient. Severe root-pruning by spade, plough or heavy discs should not occur. Such action only destroys the fibrous roots and root hairs by which the tree is sustained. The only instance where root-pruning may be desirable is when the top of the tree has been drastically pruned, and it is desired to retain the tree in a productive state. Thus it is necessary to maintain the balance between the foliage and root systems of the tree.

In conclusion, one would reiterate the saying "If in doubt leave it," but it is hoped these notes will remove the doubt concerning much of the unthrifty wood in our citrus trees.

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North Island Buying Schedules for Baconers

COMMENCING January 20, the following increase in buying schedules for baconers became effective:—

FIRST QUALITY BACONERS.

171/175 lb.	6¾d.
176/185 lb.	6d.
186/200 lb.	5d.

SECOND QUALITY BACONERS.

171/175 lb.	6⅜d.
176/185 lb.	5⅜d.
186/200 lb.	4⅜d.

Choppers to remain at present prices. The foregoing changes in the schedule necessitate grading of overweight baconers separately from choppers, and the prices quoted above are on hooks at nearest port works.

PASSION FRUIT

Bulletin No. 135, "Passion Fruit Culture," is now available **free** from the Department of Agriculture, Wellington.

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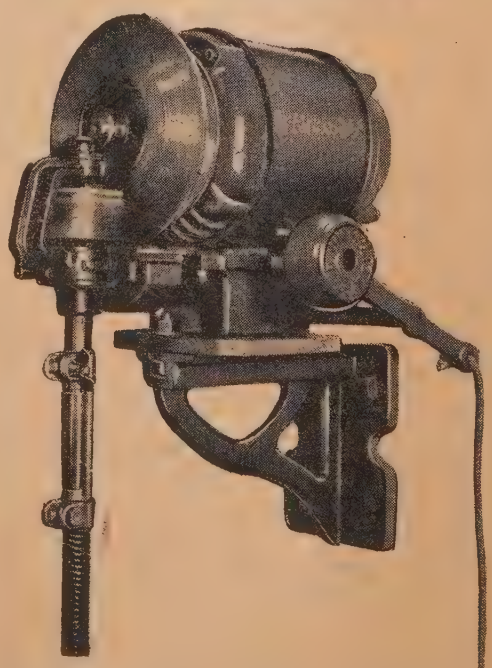

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Avoid Damaging Red-Clover Seed

THOUGH the big threshing mill will produce an excellent sample of grass seed, and the clover-huller can give a clover sample almost equal to machine-dressed seed, these harvesting methods, under war-time conditions, have often entailed too heavy labour costs, particularly with light crops.

As an economical method of harvesting, the header harvester has played an important part in popularising small seed production in North Canterbury. Either the beater or peg drum type of machine will give a satisfactory seed sample if the crop is "in condition" and the machine correctly set. However, through lack of experience, some farmers fail to obtain the maximum returns from a crop, either by losing seed with the chaff which goes over the back of the header or by damaging seed in the concaves.,

It must be realised, however, that it is virtually impossible to make a satisfactory job of a crop that is really out of condition. The only way to deal with such a crop is to leave it in stack until it becomes suitable for threshing.

Care Needed

Damaged seed, due to incorrect settings rather than to "out of condition" crops, has been particularly common in red clover samples in recent years. As slightly chipped seed cannot be removed by machine dressing, it has frequently been found impossible to obtain the minimum standard of purity required of certified seed. This results in a serious loss which with a little care could be avoided.

It must be understood that the settings advocated by the makers of the various header harvesters are intended only as a guide, and that adjustments are made necessary by variations in crops and climatic conditions. It is, therefore, advisable to examine the seed, as well as the straw, at frequent intervals throughout the day.

Cause of Trouble

Damaging of red clover seed is usually caused by an incorrect setting of the concaves to the drum. Although, in the case of the peg drum, the severity of threshing is governed by the number of pegs in the concaves, even if clover is being broken, it is not usually advisable to reduce the number of pegs, as inaccurate centreing of the pegs is the most likely cause of the trouble.

Whether it be beater or peg drum, an accurate drum setting and a fast riddle speed result not only in efficient threshing but also in preventing overloading of the riddles, thereby ensuring that an excessive amount of material is not returned to the drum for re-threshing. If seed is being lost with the chaff, care should be taken that the blast is not reduced sufficiently to allow the material to lie "dead" on the riddles. By opening the riddles, this loss of seed can be overcome.

Adjustments

If it were possible to set down hard and fast rules to cover all crops and conditions, one could be assured that the makers of harvesters would do so, but as that is obviously impossible, the farmer will be repaid by inspecting both seed sample and straw and making adjustments when necessary.

—E. G. SMITH,
Fields Instructor, Rangiora.

Journal of Agriculture

ENQUIRIES have been received from two prominent agricultural organisations for complete sets of bound volumes of the Journal of Agriculture. Any reader willing to dispose of bound volumes please communicate with the Editor, Journal of Agriculture, Box 3004, Wellington.

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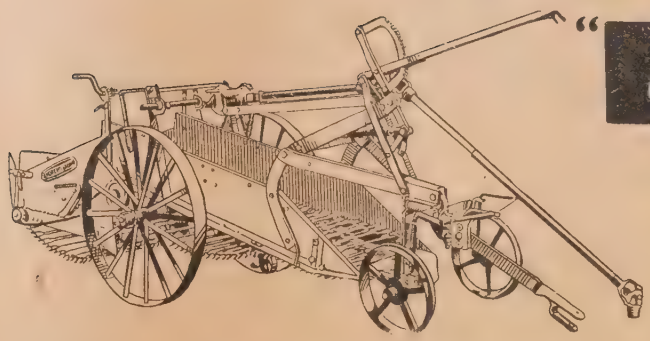

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CHEESE WHEY AS A PIG FEED

What Are the Possibilities of Commercial Pig-Keeping on Whey?

Previous articles in this Journal have dealt with the possibilities of whey from the farmer's outlook. In view of the number of enquiries received from dairy factories all over New Zealand, and the urgency for increased production of pig-meats for the Pacific armed forces and local consumption, this article should clarify the position as it applies to the use of whey as the basic feed for commercial pig-keepers, and at the same time give the necessary information to factories contemplating the utilisation of their own whey supplies.

— By —

H. M. PEIRSON,

Acting Superintendent of the Pig Industry, Wellington

WHEY has a feed value two-thirds that of skim-milk, therefore, one-third of the total feed should be a concentrate, such as meat-meal, barley, maize, and wheat. In addition, due allowance must be made for winter feeding, when the basic feed—whey—is in short supply. This again increases the quantity of concentrates required, depending upon what grazing is available. Root crops, if provided, together with a little meat-meal, will make the winter feed position safe. Thus, in giving an estimate of the number of pigs or the amount of pig-meat that can be produced on a cheese-factory's output of cheese, the total feed available—whey, concentrates, and other feeds—must first be ascertained.

It is recognised that under ordinary conditions six tons of feed of barley quality will produce one ton of pig-meat, which is represented by 28 porkers or 16 baconers. On this basis, it is easy to estimate the number of pigs that can be carried for pork or bacon on a given feed supply.

Where the equipment is good, and the management efficient, the average sow should produce 12 pigs per annum. Therefore, the number of sows to be carried will largely depend upon the kind of pig-meat to be produced—pork or bacon. This, in turn, will to some extent be controlled by the factory output of cheese from year to year, and the variability of the seasons, which affects milk production.

A poor milking season may mean that second litters will have to be turned off as pork, or again, badly arranged farrowings will cause insufficient pigs to be on hand at the flush of the season, resulting in a wastage of whey, the basic feed. Too many pigs, when the flush of feed is past, will also mean poor pig-meat returns. It will be appreciated that the best equipment cannot compensate for variable seasons or inefficient management.

While it is a well-established fact that buttermilk constitutes an ideal pig feed, much sought after by those who concentrate on commercial pig-keeping, it will be remembered that it is only in the last 20 years that pig-keeping with a main feed supply of buttermilk has been looked upon as a profitable venture in New Zealand. Prior to this, dairy factories found it difficult to dispose of this surplus by-product, and a considerable amount of money was spent by way of drainage and other facilities for its removal from the site of the factory.

The same position now arises in respect to the disposal of whey from cheese-factories. In Southland many of the factories pay £50 to £100 a year to have whey removed. There are cases on record where factories in the North Island have gone to the expense of excavating huge pits for its disposal.

Over the past ten years considerable investigation has been carried out to ascertain the profitability of using whey as pig-feed, and most satisfactory results have been obtained. Some districts, particularly Taranaki, were quick to see the advantages of these investigations, and in consequence pig production was greatly increased. Prior to the recent fall in killings this district slaughtered over 100,000 pigs per annum.

COMPARISONS.

As already pointed out, buttermilk has long since been proved a satisfactory pig feed. Commercial pig-keepers make contracts with dairy companies for the purchase of buttermilk, usually for a term of years, on the tonnage basis of the butter manufactured. The purchase price varies from £10 to £30 per 100 tons, the amount of buttermilk available being approximately 125 tons.

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This provides 15 tons of pig-feed, equivalent to the same weight of barley.

FEED VALUE—WHEY.

To make a case for the feeding value of whey for pigs, it is presumed that one ton of cheese is manufactured from 2,240 gallons of whole milk. Seventy-five per cent. of the milk is retained as a by-product, representing 1,680 gallons of whey. Whey has a feed value of two-thirds that of skim-milk, and therefore the by-product of one ton of cheese is equal to 1,120 lb. of pig-feed of barley quality.

To this feed one-third, as represented by gallons of whey or pounds of feed, is added as meat-meal or other concentrates (370 lb.), bringing the total feed for pigs per ton of cheese produced to 1,490 lb. An allowance of 100 lb. of concentrates for every ton of cheese produced, on the season's output, will make ample provision as a supplementary feed for pigs carried through the winter period of 90 days on grass, fern, or roots.

PRODUCTION OF PIG-MEAT ON WHEY FROM ONE TON OF CHEESE.

It has already been stated that six tons of feed are required to produce one ton of pig-meat, and that one ton of cheese provides, when supplementary feeds are used, 1,490 lb. of pig-feed.

On the basis of 6 to 1, 270 lb. pig-meat are produced per ton of cheese manufactured. With pig-meat at 6d. per lb. the gross return for pigs would be £6/15/-.

These returns are conservative, while the amounts of meal and other feed used in obtaining this return are on the liberal side. It will also be noted that no account is taken of grass, fern and roots fed, which provide a considerable portion of the ration for dry sows and heavy stores, and in effect saves whey, making greater production possible.

To summarise, the by-product of one ton of cheese supplemented with a suitable meal ration will produce two bacon pigs. The net return depends upon: **(a) Size of factory; (b) Amount of whey returned to suppliers; (c) Kind of equipment; (d) Supplementary feeds; (e) Provision of winter feeds; (f) Addition of lime to the whey; (g) Good grazing and efficient management, this being the most important factor.**

ESTIMATES OF PIG PRODUCTION.

Factory Output—450 tons of cheese. The estimate is based on the following premises:—

1. 1 ton of cheese yields 1,680 gallons of whey.
2. 1,680 gallons of whey equal 1,112 lb. of pig-feed.
3. Whey is used along with meals, 4 gallons of whey, 1 lb. of meal.
4. Crops to be provided for winter feeding.
5. 6 tons of feed, of barley quality, produce one ton of pig-meat.
6. All pigs to be bred on the farm.
7. Pig-meat at 6d. per lb.

Feed Supply:

	Tons as pig-feed.
450 tons of cheese equal	225
112 tons of meat-meal and grain equal	112
Total feed, not including winter feed	337

Pig-meat Production:

6 tons of feed for 1 ton of pig-meat equal 56 tons of pig-meat.

Number of Pigs Required:

16 140-lb. baconers to the ton equal 896 pigs.

Number of Sows:

12 pigs per sow per annum equal 75 sows.

Gross Returns:

56 tons of pig-meat at 6d. per lb. equal £3,136.

Capital Required:

EQUIPMENT FOR 75 SOWS PRODUCING 896 BACONERS.

Capital outlay is usually estimated at £3 per baconer pig produced, but the kind of equipment depends largely on the site of the piggery.

	£	£
40 farrowing units at £25	1,000	
Store pig accommodation for 300 pigs	300	
Fattening-house to accommodate 100 pigs	300	
Tank-stands for whey and water	200	
Pipe-line and sundries	500	
		2,300
Live-stock:		
75 sows (bacon pigs mated) at £5	375	
2 boars at £10	20	
		395
		£2,695

Annual Costs:

	£	£
Interest on plant and live-stock, 5 per cent.	135	
Depreciation on plant and live-stock, 10 per cent.	270	
Labour (2 men) at £300 and £200, respectively	500	
Sundries, crops, cartage, etc.	200	
Meals at £12 per ton (112 tons)	1,344	
		2,449
Land, 50 acres at £40 per acre —interest on £2,000, at 5 per cent.		100
Total annual costs		£2,549

The difference between the gross returns, £3,136, and the annual costs, £2,549, is the net return for the whey, £587—approximately 26/- per ton of cheese produced, i.e., .19d. per gallon of whey, or .28d. per lb. of butterfat.

(a) Returns for pig-meat are based on 6d. per lb., **schedule is 6½d. per lb.**

(b) Under feed supply is shown an expenditure of £1,344. **This is reduced to £1,120 where meals are purchased at £10 per ton.**

(c) Number of pigs produced is based on 140-lb. carcases. If carcase weight is increased, it would reduce the number of sows necessary to produce the stated tonnage of pig-meat.

(d) Capital costs are stated on a liberal basis.

(e) Annual charges are shown on a liberal basis also. Depreciation is not likely to be 10 per cent. where adequate conveniences are provided in the first instance. Sundries comprise items of expenditure which need further consideration. This depends upon the locality, and on the position of the piggery.

(f) No production is shown against crops produced, the provision of which would further increase production, and likewise expenditure.

(g) Stock other than pigs would be necessary to control the pasture of 50 acres. No account is taken of such a return.

(h) The manurial value to the farm of 1,000 pigs per annum is also an important factor.

In general, the estimates should be viewed as conservative, especially on the productive side.

Gallon for gallon, whey has a feed value of two-thirds that of buttermilk. Cheese is made from whole milk delivered to the factory. Whey represents 75 per cent. of the whole milk. For every ton of cheese, seven and a half tons of whey have to be disposed of. This whey, used as a pig-feed, represents half a ton of feed of barley quality.

Contracted for on the same basis as buttermilk, at a given price per ton of cheese manufactured, it would prove an attractive proposition where the factory was of sufficient size to warrant the establishment of a community piggery, working on the assumption that 100 tons of cheese provide 7,500 tons of whey, equivalent to 50 tons of feed of barley quality.

Pigs

THE basis of success in pig production is management. The object of the Department's **free bulletin**, "Modern Methods of Pig Production," is to provide some of the essential information necessary to successful management. If you have not a copy of this bulletin send for one today.

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The Budding of Pip and Stone Fruit Trees

BUDDING is universally adopted as the best and most economical method of raising young trees. It is also the best way to rework old trees of stone-fruit species, which do not readily conform to grafting. The reworking of pip-fruits is usually effected by grafting because that method saves time; otherwise budding would be utilised for those trees also, the union of a bud with the stock being more certainly perfect than that formed by a graft. Buds should be taken from thrifty trees, as to some extent at least "like begets like." It may well be that certain trees are a better type and produce generally better

— By —

The Horticulture Division

results than others of the same variety. Common-sense should lead one to propagate the better type, although in some instances the difference in the trees is due to treatment and not inherent. Every perfect bud contains the rudiments of a tree. Buds for working must be fully developed, but not ripe. The shoot from which a bud is taken must not have completed its growth. Sap must be flowing in both the stock and the shoot from which the bud is taken, otherwise there will be no flow of the elements that are necessary to form the union.

Time to Bud

This is to some extent influenced by the state of preparedness of the stock. The buds are taken from the new shoot, and the stock-wood into which they are to be inserted should be of the same age as the wood the bud comes from, so that the sap of both is in a similar state of elaboration. The order of budding is as follows, although there may be some overlapping because of the unpreparedness of stocks, and also a difference in the readiness of the buds of different varieties of the same fruit. The extension of time is ruled by two circumstances: there must still be growth in the bud-wood, or the buds will be too ripe; and there must be growth in the stock, or there will be no flow of sap to form the union.

First comes cherries, in December; secondly, apricots; thirdly, plums, apples, and pears; and, fourthly, nectarines and peaches, the time for the latter being from the latter half of February through March.

Bud Selection

The necessity for securing sufficient growth in the stock precludes the use of the buds first formed, which are, of course, near the base of the shoot; nor is it advisable to work too early, as the buds are to remain dormant until the following spring. For these reasons budding is delayed as late as the state of growth in the bud-wood will admit. At the time of budding the first-formed buds will be too ripe. Those on the lower end of the shoots do not elaborate completely. The bud is in consequence taken from the middle portion of the shoot, rather nearer the base than the top. This rule is not a hard-and-fast one, but is a safe guide

(1.) Shoot of current season's growth, with buds; X indicates how to cut out bud; remove leaf at line /. (2.) Single bud ready for insertion. (3.) Triple bud ready for insertion. (4.) Incision made through bark of stock. (5.) Same with bark opened. (6.) Same with bud inserted. (7.) Bud tied. (8.) Growth from bud tied to snag of stock; snag to be cut off at X after midsummer.

for beginners. The shoots from which the buds are taken should be of medium thickness. The buds on gross shoots are too soft, and those on weak shoots are too small to handle successfully. The strength of the wood is, of course, comparative with the general habit of the tree. It is important that wood-buds be taken: a blossom-bud will not grow. As a rule there is no difficulty in distinguishing wood-buds; they are usually thinner and more pointed than fruit-buds. With peaches and nectarines it is best to take treble buds, as one of them is sure to be a wood-bud. The same applies, although in a lesser degree, to the cherry, apricot, and plum.

Bud-sticks

When budding operations commence the initial step is to secure the buds. The shoots are cut from the selected tree, the upper and lower portions cut off, and the leaves removed. About ½ in. of the petiole or foot-stalk of each leaf is left on. The shoots so prepared are called bud-sticks. The bud-sticks must be kept quite fresh, the best plan being to stand them in a bucket in which there is an inch or two of water. When buds are obtained from a distance they should come packed in damp moss and bound up in waxed paper. On receipt they should be at once unpacked and immersed for two or three hours in water, then treated in the same manner as home-grown sticks. They are to be carried in this way to the scene of operations, and each stick taken from the bucket as it is wanted.

Stocks

Where old trees are to be reworked by budding, a practice usually adopted for stone-fruits (apples and pears are usually grafted), the trees must be headed down towards the end of winter or early in spring. New growths will emerge from the stumps. A selection is made from these, and a sufficient number to form the foundation for the new tree is left evenly disposed around the stump. It is in these new branches that the buds are inserted, and all shoots not wanted should be removed while quite small. At the time of heading down, the scars where limbs were cut off should be painted over with white-lead and oil, or a reliable crude petrolatum jelly. This will not only prevent possible cracking and decay, but also the entry of disease spores, e.g.; silver-blight, etc.

Young trees are propagated by working the buds on stocks raised for the purpose. Cherries are worked on seedling cherries, the Mazzard being mostly used; apricots on seedling apricots (which in normal conditions is the best method) or on plum; peaches and nectarines on peach-stocks raised from stones. The stones should be taken from vigorous trees. When removed from the fruit the stones should be dried and stored away till towards the end of June, then buried in the ground where it is not too wet. During the first half of September they are lifted and planted in nursery rows in drills about 3in. deep. The young trees will be ready for budding the same season. Peaches and nectarines are sometimes worked on plum stocks, their purpose being for planting on wet ground. It is not certain that any great advantage is gained, but, however that may be, peaches are not likely to succeed on any stock if the soil is wet during summer. Plums are usually worked on Mariana or Myrobalan stocks, the latter being the cherry-plum. Both can be raised from cuttings or stones. Japanese plums do well on peach-stocks. Pears are worked on seedlings raised from pips, and some varieties on quince-stocks, which are raised from cuttings. The purpose of the quince-stock is to dwarf the trees and promote early fruiting. Dwarfing stocks are, however, now largely superfluous, as the modern system of allowing trees to fruit on the ends of laterals brings about a state of early fruiting in a better way. Apples are usually worked on the Northern Spy and certain East Malling types, and more rarely on Winter Majetin. These stocks are raised by root cuttings, by grafting pieces of Spy wood on pieces of Spy root, and by layers.

Operation of Budding

It is highly important that the operation be carried out quickly; neither the bud nor the alburnum[1] of the stock

(1 The white and softer part of wood between the bark and the heart-wood.)

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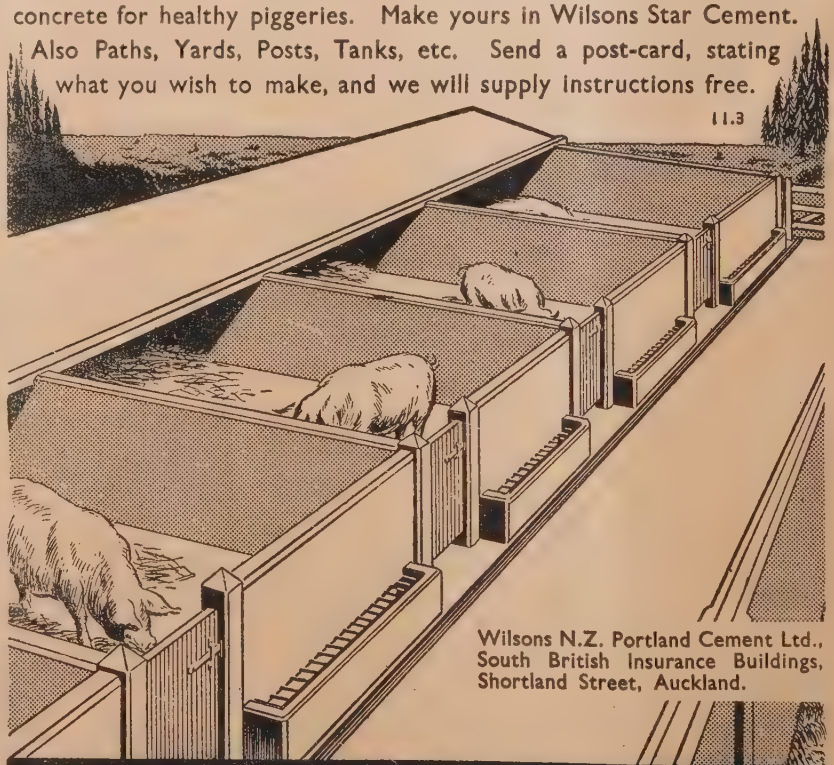

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must be exposed to the drying influence of the air a moment longer than is necessary. The work must be neatly done, the union depending on perfect work. It must also be deftly done, for there must be no injury to bud or stock. The bud must not be bruised, and the wood of the stock must not be injured by rough manipulation of the knife. For the work a very sharp knife is required, and some strands of raffia about 12 in. long. These should be cut to the necessary lengths and looped to a strap round the waist of the workman. Plums are budded about 3 in. above the ground, as it is preferred that they make their own trunk. Other fruits are worked from 6 in. to 9in. from the ground.

The method of making the bud, and also the cuts in the stock, admits of several modifications. These are for the experienced operator. It will be sufficient for the present purpose to explain the orthodox plan of budding. In former times it was thought necessary to remove the small chip of wood that is taken with the bud. Modern budders do not do that with pip-fruits, and some do not do it with any fruits; others still adhere to the old plan with stone-fruits. When the wood is not removed the bud is cut much thinner than it would be if the wood were to be taken out. The buds with the wood adhering are more readily pushed into the cut than the others, and the method has that advantage as well as saving time, a matter of considerable moment in large operations.

Judgment is required as to the exact thickness to cut the bud, and as this bulletin is intended for the instruction of beginners it seems best to explain the old plan, which is more simple and equally effective. The way in which the bud is cut out simplifies the operation. Begin the cut below the bud, not above it, as appears to be advised by some writers. The reason is that the lower part of the bud has not to be cut again, whereas the top has to be again cut. Also by cutting that way it may be made easy to remove the wood from the back of the bud. Press the knife in ¼ in. or so below the bud, turn the blade nearly flat, and carry it up under the bud. When ¼ in. above the bud deflect the back of the knife a little so as to bring the blade out ¾ in. above the bud; then when the blade is nearly out give a quick pull upward; that will drag off a narrow strip of bark and of wood. It will be found that the bark and wood will separate at the end of the dragged-off portion, so that it is quite easy to lay hold of the wood with the point of the knife and the thumb of the hand that holds the knife. Hold the bottom end of the bud firmly between the thumb and à finger of the other hand, and pull the piece of wood sharply downward. It will then come out without injuring the bark. If the bud is too ripe the germ may come away with the wood. The germ shows as a small raised lump in the middle of the shield, and if a hollow appears instead the bud will be useless. This will not often occur if the buds are in the proper condition.

Being ready for work, the operator turns his back to the young stock, plants a foot on either side of it slightly backward, so that the young branches, if there are any, are caught by his legs and pressed back out of the way; or he bends over and takes the stock between his left arm and left leg. He then makes a horizontal cut at the required height in the stock, inserts the point of his knife 1 in. below the first cut, and brings it up vertically to the middle of the horizontal cut. Each cut must penetrate through the bark but as little deeper as can be managed. When the knife reaches the horizontal cut it is given a slight twist on either side, so as to slightly raise the bark at each intersection. A budding-knife is made with a flattened haft intended for raising the bark, but it is better to avoid using the haft, as it is liable to injure the cambium and is seldom required. If the sap is flowing freely in the stock there will be no difficulty in forcing the bud into its place, and it is better for it to make its own way than to make the opening with the haft of the knife, as the union will be closer. The lower end of the shield of the bud must go down to the bottom of the incision. The upper end of the bud will project above the cross-cut, and is to be cut off so that it will fall into place. The cut end of the shield will then be in close contact with the bark at the cross-cut.

Binding-up is done by laying the middle of a strand of raffia against the back of the stock, then bring both ends simultaneously round and across the front over the lower part of the incision. Pull both ends of the raffia rather tight in this place, as it tends to arrest the downward flow of sap and concentrate it about the bud. The next turn round the stock should bring the raffia across the upper part of the incision. The actual bud should not be covered, but the remainder of the incision should be perfectly covered in order to exclude light, moisture and air. Except in the place mentioned for tight tying, the bandage should be firm but not tight.

It sometimes happens that the bark of the stock is very thick—this being often the case with peach-stocks—and in that case it may be difficult to force the bud in. This difficulty is met by cutting a little slice off the bark immediately over the vertical incision, and the bud will then slip in. The stub of leaf-stalk left on each bud serves to handle it. The stub is a help when binding, and also indicates the state of the bud. If it remains fresh for a week after budding the bud will have taken; if it withers in a few days the bud has failed. In case a bud fails another may be put in, but it must be in another place a little above or below the failed bud.

About three weeks after budding an examination should be made. If it is found that the ties are becoming strained by the swelling stock, run the knife through them on the back of the stock, but do not remove them, as they shade the buds. The ties are sure to require cutting within about four weeks.

After Treatment

Nothing has yet been said about cutting down the stock plants. This must not be done until the end of the following winter. There is then a choice in procedure. Some prefer to leave from 4 in. to 6 in. of the stock above the bud. This stump serves to tie the young growth of the bud to, so as to secure a straight trunk, and also to prevent its being broken by wind. Others cut down to about 2in., and provide sticks to which to tie the young trees. Whatever is done the stump left must be cut down close to the union about midsummer. The scar soon becomes healed over. It would not be wise to cut the stock down close to the bud in the first place. Some live wood is required above the bud, or the wood near the bud may dry up before the bud is well established. In some localities it is, however, now the custom to cut close down in the spring. The cuts may be painted over with a mixture of white lead and oil, or smeared with green crude petrolatum to prevent possible entry of disease spores or infection by the woolly aphis.

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Veterinary Notes for the Farmer

Rearing of Pigs

FEEDING and management are the two main factors in the rearing of healthy, profitable pigs, but they must go side by side, for either one without the other will result merely in a waste of time and money, with disappointing results.

How the idea originated that the pig is a dirty animal would be hard to say, but in the comparatively short time since its domestication it has been coupled with dirt, and generally speaking it is customary to find filth its bed-fellow.

Those who refer to pigs as dirty animals are really casting a reflection on themselves, for it has long since been proved that the pig is as clean as the conditions will allow it to be.

When well looked after, and in good surroundings, it is quite as clean as any other domestic animal. Unfortunately, pigs have been given a bad name. Most people have taken it for granted, and have never given the animals a chance to disprove it.

To Make Profits

It is quite safe to assume that anyone who keeps pigs wishes to make as much profit from them as possible, but some pig-keepers defeat this object by neglecting a few essentials which are a necessity in the production of the healthy pigs that bring satisfactory returns.

The worst features seen in many piggeries are:—

1. Unsuitable sites.
2. Wet and draughty housing.
3. Over-crowding.
4. Insanitary conditions.
5. Lack of shelter and shade.

As far as this article is concerned, the type of piggery is unimportant, but the condition and situation are of importance. Far too often, the distance from the cowshed is the main consideration, regardless of drainage and suitability for the health of the animals. The picture of an evil-smelling, muddy, dirty, and damp pig-run, jammed in some forsaken, but convenient, hollow, and inhabited by miserable, unthrifty pigs, is one that, because of its prevalence, comes frequently and easily to the mind.

This sort of thing is an expensive way of saving labour, and makes any work in connection with it unpleasant and unproductive. The little extra labour entailed would be rewarded many times if the piggery was a little further from the cowshed on some sunny well-drained slope.

Permanent Runs

If the runs are to be permanent, as most are, make the houses so that they can be shifted, and the runs large enough to be ploughed, instead of having dirty pens that, because of continuous use, become a hot-bed of disease and parasitical infestation. If for any reason the pens could not be ploughed, a heavy dressing of lime would be a great advantage. This, of course, means sufficient runs to enable some of them to be spelled.

The drainage from the fattening pens is a feature that is often neglected, with the result that a horrible-smelling stream of filth saunters in a lazy, haphazard manner across one or more of the runs. Few would think of letting this happen anywhere but in a piggery.

It requires only a little thought and care to arrange the pens so that the drainage is taken well away from any enclosure.

Weather-Proof House

Because a place is being built for the housing of pigs does not mean that anything at all will do. A draughtless, weather-proof house is essential. Contrary to the general impression, domestic pigs, or for that matter, any pigs, are not able to withstand adverse conditions and are particularly susceptible to pulmonary diseases, so it can be readily understood that where the only house is a place full of wide cracks into which pigs can cart a sea of mud, they can scarcely be expected to thrive. The rain beats into such houses.

The sun is an enemy of germs, so it is worth while having a house into which the sun can be admitted, without sacrificing the suitability of the building to withstand the weather.

Over-crowding

One of the worst features in connection with pigs is over-crowding. In fattening-pens, 10 to 15 pigs are often crammed into a pen that would hold only seven or eight in comfort. Consequently, it is impossible to keep the place clean. Even if there should be a dunging race, and there seldom is, it would be difficult for the over-

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crowded pigs to make their way through the others to use it.

Through fighting and crowding, pigs are likely to become injured or to receive cuts or abrasions, which, because of the ever-present dirt, are liable to develop into more serious troubles.

In the outside pens, when conditions allow, every part of the small run is rooted and trampled, and the animals are forced to live in a sea of mud. Under these conditions nothing could thrive. No one would think of confining a proportionate number of any other class of animal in such a small space, but because a pig can show some sort of return under such con-

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ditions people are perverse enough to abuse it.

Sanitation

Anyone housing stock will appreciate that there is a considerable amount of cleaning to be done daily, and that this is a task which cannot under any circumstances be neglected.

Even the milking-shed, if left for a milking or two, would become almost uninhabitable, and the cows are there for only a few hours daily. Horse stables, if not constantly cleaned, quickly get into an objectionable state. The daily cleaning of these places is taken as a matter of course, but at such times as harvesting or ploughing the piggery is left altogether.

Some places are seldom washed out at all. This is not conducive to making the pigs healthy or contented, both of which conditions are a definite help to fattening. Like all other places, the piggery is easy to clean if kept clean, and so one finds the work more pleasant and less likely to be avoided, when the surroundings are clean and the atmosphere congenial to both man and beast.

Shelter and Warmth

People forget or fail to realise that pigs appreciate shelter and warmth just as other animals do. Piggeries, especially those situated in open country, usually get the full blast of the weather, and unless some shelter is grown, wet, cold pigs move disconsolately about, coughing and wheezing, in an endeavour to find some sheltered spot.

The time has passed when pigs can be looked upon as a glorified sewer for skim-milk and whey. Given the care and attention that common decency dictates, they can be made a very profitable undertaking.

Strangely enough, while pride of ownership is evident in any other class of stock, the pig in most cases seems to be an exception to this rule. Maybe the scavenger idea has been allowed to cloud our appreciation of the reproductive qualities of the pig, due largely to the fact that it has lived under adverse conditions so long, and has shown a profit. We may now begin to realise the potentialities of this animal.

—J. G. MITCHELL,
Inspector of Stock,
Kaikohe.

SUBSCRIPTION RATES.

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Answers to Correspondents

Red Worms in Horses

"E.A.H." (Silverdale):—

I recently purchased an 8-year-old hack. Her dung is not normal; it is sloppy, and there are dozens of small worms, about ½ to ¾ of inch long, red in colour; also a few white worms, about 2 inches long in the dung. The mare is in fair condition, although she is tucked up a bit. Occasionally she kicks at her belly, as though she had gripes, but she only gets grass and a feed of hay. Some months ago she was in the Army, and was hard fed.

She is quite active and appears to be in good health, her coat is short and shiny. Can you tell me what these parasites are, and the treatment for same?

Livestock Division:—

The worms infecting your horse are commonly known as "red worms" and they cause more concern among breeders than any other internal parasites. Although horses of all ages may harbour this parasite, the condition produced by gross infestation is much more serious in young horses. In order to exercise control measures over this condition one must have some idea of the means by which young horses become infected. The mature worm, which inhabits the large bowel of the horse, lays eggs which pass out in the droppings. Provided the conditions of temperature and moisture are suitable, these eggs hatch and small worms emerge, but further development is necessary before these worms are capable of infecting other horses. **The time taken to reach the infective stage varies from a few days to weeks.**

The infective larvae, as the worms are named at this stage, gain entrance to the bowel by being taken up in the food or drinking water. From the bowel they enter the blood stream, where they occasionally cause trouble by becoming lodged in certain blood vessels. On leaving the blood stream the larvae again enter the digestive system, where they develop into mature worms in the large bowel. Symptoms exhibited vary with the number of parasites present. Young horses which are heavily infested become very unthrifty and the coat is dry and rough. As the disease develops the affected animals gradually lose condition, becoming weak and anaemic. In some cases diarrhoea is present. A less frequent symptom, but

Advisory Service on Veterinary Matters.

Farmers are invited to submit inquiries connected with the health of their stock, and the replies will be published under this heading.

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one which is occasionally shown, is that of colic, the abdominal pain resulting from larvae becoming lodged in the blood vessels supplying the bowel. Some obscure forms of hind-leg lameness may be traced to the effects of the larvae in the arteries carrying blood to these parts.

Medicinal treatment has an effect only on the mature worms in the bowel, and has no action on those in the immature stage which are distributed in other parts of the body. However, beneficial effects may be obtained by expelling as many of the adult worms as possible. A suitable drench for this purpose is:—

Turpentine, 2 ounces.
Raw linseed oil, 1 pint.

A recent discovery, a drug known as phenothiazine, has proved highly effective in the treatment of these worms. As it is practically tasteless it can be given in doses of 7½ to 10 drams in chaff or in a mash. Animals need not be starved before or after treatment, but a short fast may ensure that the whole dose is consumed when exhibited in the feed. Doses greatly in excess of those recommended can be given without ill effects, but care should be taken with weak and anaemic horses as reports suggest that such subjects may react severely with large doses.

In addition to medicinal treatment, it is important that nourishing food, such as crushed oats and bran, be supplied.

On farms, where trouble is experienced from the effects of red worms, it should be the aim of the person in charge to prevent as far as possible gross contamination of the pastures. The risk of heavy infestation may be minimised by keeping young horses off paddocks which have been used largely for grazing other horses. Remember that larvae reach the infective stage on the pastures, and also that they may remain active on the grass for about 12 months.

Horses should not be allowed to graze the same paddocks for long periods. Overstocking with horses may lead to heavy contamination of pastures. On some stud farms the practice of removing horse droppings from the paddocks each week is adopted, with good results.

Health of Poultry

TO recognise disease in the early stages and to know how to maintain the health of birds is essential to successful poultry keeping. The following **free bulletins** may be obobtained from the Department of Agriculture, Wellington, Auckland, Christchurch and Dunedin: "Internal Parasites in Poultry," "Coccidiosis in Poultry," and "Pullorum Disease, or Bacillary White Diarrhoea of Chicks."

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Plan — Encourage Ideas — Improvise

Slaughterings of Stock

THE following returns of slaughterings of stock at meat-export slaughterhouses and abattoirs for the months May to December, 1943, have been compiled by the Livestock Division:—

District.	Cattle	Calves	Sheep	Of which Ewes were	Lambs	Pigs
North Island.						
Meat-export Slaughterhouses—						
Auckland	116,395	583,171	111,078	48,178	457,586	122,121
Poverty Bay-Hawkes Bay	23,744	58,789	86,920	39,222	599,905	15,431
Taranaki-Manawatu	57,133	200,641	54,460	29,750	360,477	72,427
Wairarapa-Wellington	22,154	28,234	65,788	30,064	216,218	14,637
Totals	219,426	870,836	318,246	147,214	1,634,186	224,616
Abattoirs	91,436	26,343	443,506	181,286	90,570	32,627
North Island Totals	310,862	897,179	761,752	328,500	1,724,756	257,243
South Island.						
Meat-export Slaughterhouses—						
Nelson-Marlborough	1,489	10,551	7,468	4,583	47,594	6,515
Canterbury-Westland	9,258	35,198	145,145	116,695	457,533	22,935
Otago-Southland	10,053	35,419	77,886	63,477	573,128	3,922
Totals	20,800	81,168	396,431	184,755	1,078,255	33,372
Abattoirs	38,463	7,835	187,672	108,761	38,708	9,734
South Island Totals	59,263	89,003	584,103	293,516	1,116,963	43,106
Dominion.						
Meat-expt. Slaughterhouses	240,226	952,004	714,677	331,969	2,712,441	257,988
Abattoirs	129,899	34,178	631,178	290,047	129,278	42,361
Grand Totals	370,125	986,182	1,345,855	622,016	2,841,719	300,349
Same Period, 1942— Meat-export Slaughterhouses and Abattoirs	422,889	987,762	1,110,233	636,843	3,456,392	376,200
Same Period, 1941— Meat-export Slaughterhouses and Abattoirs	333,717	986,352	1,154,417	630,916	4,198,650	462,735

Slaughterings of Pigs

The 77,597 pigs slaughtered at meat-works and abattoirs during the month of December, 1943, were distributed in weight ranges, approximately, as follows:—

Up to 60lb.	236
61 to 120lb.	14,251
121 to 170lb.	54,792
171 to 180lb.	4,836
Over 180lb.	2,364
Sundries	1,118
	77,597

The grading of porkers was 93 per cent. of first quality, 7 per cent. of second quality; and that of baconers was 76 per cent. of prime 1's, 19 per cent. of prime 2's, and 5 per cent. of second quality.

In the different weight ranges the grading was as follows:—

121-170 .. .. .. 78%, 18%, 4% of P1's, P2's and 2nds respectively.
171-180 .. .. .. 58%, 33%, 9% of P1's, P2's and 2nds respectively.

Orchard Notes

Handling the Fruit Crop

THE carrying and keeping qualities of apples and other fruits are directly dependent on the care exercised to prevent mechanical injuries in the harvesting and preparation of the fruit for the market. Commercial handling practices are often unnecessarily rough, which, no doubt is responsible for a large amount of decay and deterioration which takes place in storage and after arrival on the market.

Every person, whether picker, packer or carrier, should bear in mind that fruit is a living organism which breathes and has a definite life-cycle and therefore judicious care in handling orchard products is essential. The entire fruit is made up of delicate tissue and undue pressure and abrasion will cause an ultimate breakdown of the flesh. From the standpoint of minimizing bruising or other mechanical injury, many faults in present handling practices may be readily corrected by reasonable attention to equipment and handling.

The hints given in last month's notes regarding the extreme care necessary in the handling of fruit during picking operations may be supplemented by a few points in connection with the actual preparation of fruit for the market.

Preparation for Market

After the fruit has been picked and carted to the packing shed, it passes into the hands of the grader, who sorts the fruit into respective grades according to the standard requirements laid down in the regulations. The actual practice in grading is for the fruit to be tipped from the orchard case on to the grading table. Care should be taken against overloading the table, which often causes damage by bruising and stem punctures.

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The correct method is to arrange a gradual flow of fruit on to the grading belts or rollers, thus obviating the necessity for graders holding the belts stationary while an overloaded table of fruit is disposed of. Much damage to the fruit can also be done by dirty rollers or belts on the grading machine. This applies more especially to the tender-skinned varieties of apples in the early part of the season when scratching and marking often occurs from this cause. To avoid this, the belts, rollers and bins should receive a periodical wipe-down during the season to remove all dirt particles.

Another cause of fruit being damaged by stem punctures is the practice of packers pulling the fruit down in the bins and allowing bins to become overcrowded. The damage occurs during the pulling down process, that is, scooping the fruit which is dropping from the conveyors forward to the front of the bin, the stem of the fruit puncturing the skin of another. This injury can easily pass unnoticed during the process of packing and has a disastrous effect on the fruit, causing considerable waste. Fruit in the packing bins should be packed out regularly and not on any account should overcrowding of fruit be allowed to take place.

The art of packing apples and pears is not difficult to acquire and full information of the correct procedure to be adopted may be obtained in the Journal of Agriculture, November 1937, pages 265-273, and December 1937, pages 338-348.

Points in Packing

To procure a good, even and compact pack important points for the packer to remember are:—

1.—Do not place apples that vary materially in size in the same box. Incorrect sizing generally means a faulty pack, resulting in damage to the fruit and consequent loss.

2.—Keep the rows across the box straight. Every care should be taken to see that the main axis of the apple —that is the line from stem to calyx— is always kept parallel with the length of the case, the stem of the fruit always pointing from the packer. On no account should the apples be placed angularly.

3.—Place each apple over the pocket formed in the layer beneath, so that no two fruits are directly on top of each other.

4.—Control the height of the pack by the tightness of the layer. The smaller the apple in the packs of each class the tighter the layer must be drawn.

5.—During packing, each alternate layer of fruit should receive a slight pressure from the hands of the packer at the ends of each layer. On no account should pressure be exerted in the centre of the layer. By applying this pressure on the two ends of the layer a crown is formed and when the case leaves the packer's hands the fruit at the ends of the layer should be no more than ½in. high above the top of the case, while the fruit at the centre should be approximately 1½in. higher than the case.

Spraying

All the main spraying operations will have been completed by now, but some consideration must still be given to the control of diseases and pests. Late varieties of apples and pears should be sprayed with arsenate of lead 1½-100 gallons for the control of codling moth and leaf-roller caterpillar. Leaf hopper may still prove troublesome, necessitating the application of nicotine sulphate 1-800. If red mite is in evidence spray with summer oil 1-100. For the control of brown rot late peaches should receive attention, using lime sulphur 1-150 plus colloidal sulphur 2-100 up to a period of 14 days before harvesting.

In addition, all infected fruit, both on the tree and on the ground, should be collected and destroyed. All pickers should be supplied with a small bag in which to deposit any diseased fruit encountered. In this way the late ripening varieties will to some extent be protected from infection.

—A. T. DOUGLAS,
Acting District Supervisor,
Horticulture Division, Auckland.

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Cover Crop and Organic Materials

CITRUS trees do not thrive in areas subject to more than mild frosts, nor are they suited to situations exposed to continuous cold winds. These limitations confine plantings to restricted localities which have the mildest climatic conditions available in our latitudes. Within the districts suitable for citrus cultivation, still further detailed selection of land, to ensure the best possible sites for orchard establishment, has placed most of the orchards on more or less raised gentle slopes with a northerly aspect. This undoubtedly necessary careful choosing of locations has, in the great majority of instances, ruled out the better class, more fertile land usually found on flats liable to relatively cold conditions. Much of the selected land is rather light, not naturally well supplied with humus and, especially in dry seasons, exposed to long spells of high temperatures which tend to burn out the organic material. Some of the slopes suffer to a limited extent from erosion and loss of the more fertile top soil.

Value of Humus

All these circumstances combine to make regular additions of humus, in some form and in considerable quantity, necessary in soil used for growing citrus trees, for there is no doubt that soil well supplied with organic material produces better trees, and better crops, than does land lacking in this respect. Growing crops protect the land from erosion, while soils well supplied with humus absorb greater quantities of water, hold it better, and are less subject to erosion.

Animal manures are beneficial for the soil but, except for a small number of orchards, are too difficult to obtain in sufficient quantities. The main alternative is to grow bulky vegetable cover crops and work them into the soil.

Cover Crops

The principal object of a cover crop is to provide organic matter for incorporation with the soil, and it is desirable therefore that a good bulk of material be grown. Plants suitable for the purpose include blue lupin, vetches, peas, clovers, mustard and oats. Blue lupin is generally suitable and most popular. As a legume, it is one of the group which accumulates nitrogen from the air, adding this valuable plant food to the soil as well as providing humus. Lupins may be sown at almost any time of the year; they will stand a considerable degree of frost, are not unduly damaged by ordinary orchard traffic, are easily ploughed under with the assistance of a drag chain and, in citrus districts, continue to make good growth through the winter months.

In citrus orchards, lupins may be sown in late March or April. The land should be well prepared and part of the autumn fertiliser quota should be sown with the cover crop, superphosphate being used for this purpose, while other fertilisers are reserved for more direct application to the trees. The seeding rate for blue lupin is 1½ to 2 bushels per acre, with up to 2 cwt. of superphosphate, broadcast and harrowed or disced in. The crop should be well established during autumn and ready for working into the soil during August.

Occasionally land appears to become lupin sick through growing the same crop year after year. Some other kind of crop can then be grown for a season or two before continuing with lupins for a further period.

Other Organic Materials

Humus may be put into the soil by using animal droppings or compost, or by working in material from crops grown on other than the orchard land. Ordinary weed growth also provides humus, but weeds should not be permitted to run to seed before they are turned under or mown. If compost can be used for mulching, this is probably the best way of adding humus to the soil, because the material will be well rotted down before application, and the temporary reduction of available nitrogen, which occurs during the early stages of decomposition of green material, will have taken place before the compost is applied to the soil.

Provision of humus is doubly important while commercial fertilisers are not available in normal quantities and variety. If sufficient organic material can be given to the trees to supply their needs, it may be that a change from the steady application of commercial fertilisers will be to their ultimate advantage. Cover cropping, even to the extent of growing summer as well as winter crops, is about the easiest and least expensive contribution in that direction.

Citrus Canker

During the months of late summer and autumn citrus canker is most likely to be active, especially if the weather should be wet and warm. The most conspicuous signs of the disease are brown spots, the size of a nail-head or smaller, roughly circular, slightly raised on both sides of the leaves, and usually surrounded by a clearly defined bright yellow "halo" about one eighth of an inch wide. Similar raised brown spots may be found on fruits and small twigs, but these are not so noticeable as they are not accompanied by the yellow rings. All spots are normally edged with a narrow, rather oily-looking border, but this may not be readily noticed by an inexperienced observer. The disease is most likely to be active on strong healthy trees, whereas it develops very slowly and is much less conspicuous on weak, yellow-looking trees.

—I. L. Nottage,
Orchard Instructor,
Tauranga

Seasonal Work

Continue cultivation and hand-work.
Prepare land for sowing of autumn cover crops.
Spray for control of scale insects, leafroller and thrips where necessary.
Make arrangements for autumn applications of fertilisers towards the end of April.

Don't

neglect diseases and pests in the orchard. The Department of Agriculture will post you the free bulletin on the control of orchard diseases and pests by spraying.

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Guide for the Home Garden

Campaigning With the Vegetables

A TON of vegetables, excluding potatoes, will provide a full military ration for nearly 3,000 soldiers. Therefore, every ton produced in private gardens reduces the drain on commercial and Government vegetable-producing areas, and assists to that extent in winning the battle of production. Unquestionably, the home-gardener is digging for victory.

IN Great Britain, before the war, vegetable-producing allotments under cultivation numbered 930,000, but there are now 1,700,000, while the number of private gardens producing vegetables has increased from 3,000,000 to 5,000,000. The actual personal necessity for production may be greater in Great Britain, but the obligation here to ease commercial vegetable production on behalf of the Armed Forces is equally as important.

In recent issues of the Journal emphasis has been put on the necessity for an all-out effort by the home-gardener to produce autumn and winter-maturing green and root crops to the limit of his garden capacity. It is hoped that this has been noted, as indications at present point to a not-too-plentiful supply of these vegetables being available. It cannot be too strongly stressed that everyone in possession of an area of land suitable for the production of vegetables has a duty to perform, not only to the members of his own household, but to the community as a whole.

Slogan for March

Not "watch and wait" but "work and watch" is an appropriate slogan for the home-gardener to adopt during March.

From mid-February, the depredations of the caterpillars of the white butterfly and diamond-backed moth become intensified. All members of the cabbage family, unless protective measures are taken, become ready victims to these voracious pests. The insecticides advised for plant-protection (in the January issue of the Journal) must be used in districts where crops are affected to any appreciable extent. During February and March, slugs and snails are not likely to be troublesome, but a supply of burnt or hydrated lime should be obtained and held in readiness for the advent of cooler weather. It is during the late autumn, winter, and early spring that these pests become troublesome on cabbages, etc.

Spring Cabbages

Seed of early spring cabbages, if sown during late January or February, should now be showing up well, but it will be necessary to look after the young seedlings in order to save them for planting during late March or early April. A combination spray of nicotine sulphate and arsenate of lead, or derris dust alone, will give adequate protection against all the pests likely to affect the young plants at the present time. If the seedlings are overcrowded in the seed-bed they should be thinned out, and the plants removed can be re-set. This will ensure the production of stocky seedlings, both in the seed-bed and in those transplanted. Strong, healthy plants are necessary for setting out in late autumn so that they will have a chance to make good growth before the winter cold inhibits further development.

Don'ts

DON'T omit preparation of part of the garden for spring-cabbage planting.

DON'T overlook the use of arsenate of lead in the Bordeaux mixture to be used on celery and tomatoes. These vegetables are likely to be infested with caterpillars during March.

DON'T save bean or pea seed from any but healthy plants.

DON'T think you can dig your garden by just turning it over in your mind!

Spinach

Seed may be sown as early as possible now in rich, friable, well-drained soil. Germination during March should be good, and the cooler weather will be all in favour of reasonably good growth.

Prickly Seeded is the variety suitable for present sowing. Sow thinly in rows 12 inches apart.

Lettuce

There are several varieties of lettuce suitable for winter growing, the seed of which may be sown during March—Neapolitan (Winter Market) Truperial D. and Truperial 615. The latter is recommended as specially suitable for production on light, sandy soils.

When sowing lettuce seed during autumn, care should be taken to avoid crowding the young plants. Wet weather conditions will tend to induce an attack of mildew, which, should it eventuate, will almost certainly destroy the young plants. To avoid this prospect, it may be necessary to prick the seedlings out into another box, setting them 2 inches apart each way. It is better to do this than lose the crop.

Spring Carrots

Home-gardeners desiring early spring carrots should endeavour to have seed sown before the end of March. Either Chantenay (preferably Red Cored Chantenay), Earlykrop, or Market Garden will be suitable. On very shallow soil where root penetration may be difficult, Early Short Horn should be sown. On such shallow soils, however, the raised-bed method of growing this crop may be adopted with advantage, provided none of the hard subsoil is brought to the surface of the part raised. This will make it possible for the longer-rooted, and consequently more profitable, varieties to be grown. Sow the seed sparsely in rows 12 inches apart, with the bed as far removed as practicable from where the main crop may be growing. The latter precaution should be adopted with celery and parsnips.

Tomatoes

Harvesting fruit from outside-grown plants should now be in full swing, and it will be necessary, as soon as the bottom truss has been removed, to apply additional fertiliser. As the vines will still be growing and setting fruit, it is desirable that these settings should have a reasonable chance to develop. This may be done by the use of sulphate of ammonia or nitrate of soda applied preferably in liquid form, a teaspoonful to a gallon of water, or animal liquid-manure. When these manures are applied, spraying with Bordeaux Mixture as a protection against early or late blight must be practised.

If it is intended to "stop" the plants, which, in effect, means cutting off the main top growth, two leaves and a side shoot should be allowed to remain between the place where the cut is made and the last bunch of fruit it is ex-

pected to ripen. All spent foliage should be removed from the plant and burnt. This should be cut away, not broken off. From now to the end of the season, it is very important that diseased plants should be pulled out and destroyed by burning. There is a general tendency to leave this job to the end of the season. This is definitely wrong, as the fungi or bacteria which may be the cause of the disease will, by various means, particularly by rain, have entered the soil where it can, in many instances, remain active for years. Make sure that the top of each plant is securely fastened to the stake. This will save the plants from lashing and being broken during high winds.

Onions

March, generally, is the month when the harvesting of the onion crop is carried out. Undue delay owing to wet conditions is not conducive to long-keeping quality. From mid-February, no water should be applied to the onion bed, and everything should be done to maintain dry conditions. Excessive soil moisture prolongs the growing period and prevents proper ripening of the bulbs.

Rhubarb

Plenty of water is necessary to replace that which is transpired by the large leaves of rhubarb plants. Although the roots will presently be taking their seasonal rest, watering should not be neglected, and neither should proper drainage. Seed stalks can be removed before development takes place, as these, while not serving any useful purpose, rob the roots of valuable plant food. The same remark applies to weeds, which regular hoeing will keep in check.

Asparagus

If manuring the asparagus bed after cutting was stopped has not yet been done further delay in making the application may detrimentally affect next season's production. A good handful of blood and bone manure to each crown, together with a dressing of wood ashes and some soot, will, if applied and worked into the soil at once, materially assist in maintaining the fertility of the bed. Compost, if available, may be liberally applied with advantage to the future crop. Weeds should be controlled by regular hoeing. Next season's production depends entirely on the treatment of the bed during late summer and early autumn.

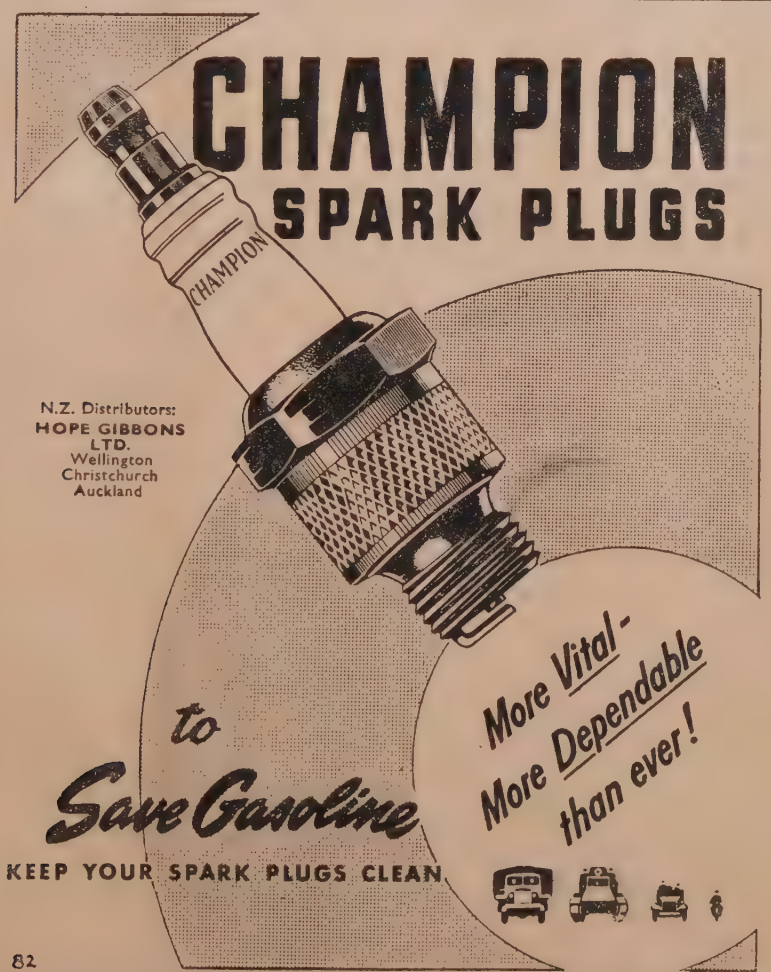
Cauliflower

Every effort should be made to encourage this crop towards maturity before frosty weather sets in. While the plants will stand a certain amount of cold, frost will definitely injure the curds. As they reach the harvesting stage, a fair amount of protection may be given by tying together, near the top, the large outside leaves. It is not advisable, nor is it good practice, to force this crop. Timely seed sowing, planting out the seedlings at the correct time, and subsequent careful attention to proper cultivation, are the best precautions against failure.

Important as the utilisation of all garden space for vegetable production undoubtedly is, there will be occasions when, between crops, areas will become vacant. Advantage should then be taken to sow a green crop, which can later be dug in as green manure. This is one and, in many instances, the only way of maintaining the organic-matter-content of the soil. The variety of crop which may be grown will be a matter of choice, but no part of the garden should be permitted to remain out of production for any extended period.

Leguminous crops—lupins, etc.—do not give their best returns until maturity has been reached. Oats, on the other hand, will give a greater volume of green material for digging in. Before digging under a non-leguminous green crop, it is an advantage to broadcast sulphate of ammonia on top of it, at the rate of 1 oz. per square yard. If this is done, plants of a vegetable crop may be set at once without danger of a set-back.

—D. K. PRITCHARD, Instructor in Vegetable Culture, Wellington.



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The Home Orchard

Numerous enquiries from the occupiers of small farm and suburban orchards have led the Department to publish a bulletin explaining the methods available for combating the commoner insect pests and fungus blights. The directions are given in an elementary form to suit the special requirements for the control of codling moth, red mite, woolly aphis, scale insects, black-spot of apples and pears, powdery mildew of apple trees and peach-curl in such orchards. Those interested in the subject are recommended to write to the Department of Agriculture at Auckland, Wellington, Christchurch or Dunedin for a **free** copy of bulletin No. 77.

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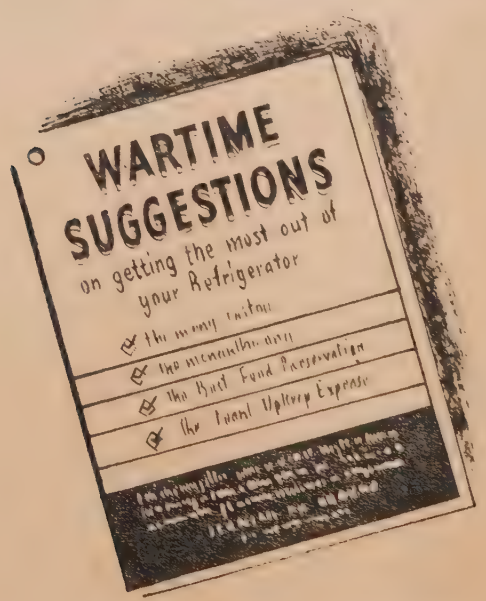

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Seasonal Work for Beekeepers

Final Extraction

THE main honey flow will cease in most districts during February and no time should be lost in removing all surplus honey from the hives. Unless facilities are available to keep combs of honey warm at the honey house, it is important to remove the last of the honey off the hives and extract it before the colder nights set in, as once honey has become cold it is impossible to get the whole of it out of the combs, particularly heavy-bodied honey.

Menace of Robbing

Robbing can be more easily prevented than cured, and if every possible precaution to prevent an outbreak is taken when removing the last of the honey from the hives, the robbing nuisance should not get out of hand. Adequate preparation should be made to complete the removal of surplus honey as expeditiously as possible.

Trays should be placed on the apiary barrow to catch any drips from the combs, and ample cloths and sacks provided with which to cover the supers. If the honey is being loaded on to a motor truck, care should be taken that no drips fall from the supers in the process. They should be stacked on trays in as bee-tight a manner as possible, and well covered. When the honey is being wheeled directly to the honey house, this should be done without delay, and all hives should be closed up immediately the honey is removed.

It is important that the honey house be perfectly bee-proof, otherwise all other precautions taken to prevent robbing will be of little avail. If there are any weak colonies or nuclei in the apiary, it is advisable to contract the entrance to each of these hives before opening up other colonies. Should signs of robbing become evident the entrances of the hives being attacked must be contracted, and wet grass heaped up in front.

A further effective contrivance is to place three ¼-inch thick blocks of wood on the alighting board in contact with the contracted entrance so as to form a tunnel. The baffling effect of this diversion causes the robbers to desist in their attacks. These methods of control would be useless, however, if robber bees had other means of entering the hives than by the regular entrance. Wet empty combs should only be returned to the hives in the evenings.

Weak Colonies

No attempt should be made to carry weak colonies through the winter, as they tend to attract robbers. The most suitable method of dealing with such hives is to unite them with other colonies by placing a single sheet of newspaper over a strong colony and lifting the weaker one on to it. Where possible the poorer queen should first be killed.

Winter Stores

Hives may be wintered in two storeys, and a minimum of 45 lbs. of honey should be left to satisfy the bees' requirements during the winter and spring period. A fairly accurate estimate of what to leave can be arrived at by allowing 5 lbs. of honey for each full comb. It cannot be taken for granted that because the honey in the two brood chambers is left undisturbed, the bees have sufficient stores. Some colonies have prolific queens that keep the brood-nest so full of brood that little honey can be stored except at the top of the frames.

If, for any reason, it is found that the stores of these colonies have to be supplemented by sugar-syrup-feeding, this should be completed by the end of March. A thick syrup, consisting of two or three parts of sugar to one part of water, should be fed. When bees are fed syrup late in the autumn, it is an advantage to add one tablespoonful of tartaric acid to every 50 lbs. of syrup. This will prevent any risk of the syrup granulating in the combs.

All the syrup should be fed to the bees at the one time, so as to prevent any likelihood of brood-rearing being stimulated by feeding over a period.

Autumn Increase

For one reason or another, it may be deemed necessary to make some increase at this time of the year. This can be done successfully provided that the new colonies, when prepared, are moved to another apiary, or, at least, a mile or so from their original site. Using standard equipment, prepare the number of hives desired by cleating full-depth supers to bottom boards and blocking the entrances with wire gauze. In order to form these colonies, the work should be carried out in the evening, and frames of brood and bees taken from a number of hives. The procedure is as follows:—

Take a frame of brood, with adhering bees, from a strong colony, and place this in the prepared hive, and cover with a sack or lid. Go to the next strong hive and repeat the operation, placing the frame of bees alongside the one already removed, but be careful that the combs are not actually touching. Remove five or six frames of bees and brood in this manner, taking care that in no case are any queens removed in the process, and finally add two frames of honey placed on either side of the brood. Frame nails should be lightly driven through the ends of the top bars to hold the frames in position whilst in transport. The new colonies should be moved the same evening, and the bees released. Young queens should be introduced after 24 hours. A supply of comb honey should be kept on hand for their winter and early spring requirements.

Requeening

The requeening of hives in the autumn is a job of the greatest importance. Some requeening will be necessary even by beekeepers who do this work in the spring and summer months. No queen that has headed a colony for two seasons should be tolerated any longer. Many such queens show remarkable vigour and egg-laying capacity towards the close of a season, and an inexperienced beekeeper may be tempted to give one a further trial. While an occasional queen may be found to give good service during a third season, it is a very risky business, as most of them fail during the following spring, with disastrous results to the hive. Every colony in the apiary should be headed by a young and vigorous queen. Any queen not up to standard should be replaced at once.

Hive Entrances

Entrances to hives should be contracted as soon as convenient after the removal of the last of the honey. Ample ventilation is just as important to colonies throughout the winter as it is during the summer, and for this reason entrances need only be contracted sufficiently to keep out mice. This can be done by reducing the height of the entrance to 3-8-inch and retaining the full hive width.

—R. S. WALSH, Apiary Instructor, Auckland.

Poultry-Keeping As a Source of Income

(Continued.)

— By —
F. C. BOBBY,
Superintendent of Poultry Husbandry, Wellington

THE choice of a district in which to establish a poultry-farm is influenced largely by personal factors. Individuals have various likes and dislikes in the matter of a district in which to settle, while family connections may be a deciding factor. Broadly speaking, there is no "best" district for poultry-keeping, although obviously certain districts offer advantages over others.

Two major factors have to be considered, namely, supplies of poultry foods must be readily available at economic prices, and there should be an available market for all poultry commodities produced on the farm. This tends to suggest that the farm should be within easy distance of a city where poultry products are required, or, at least, near to a town giving good railway or port facilities for the transport of produce to consuming centres.

Land values rise sharply near such consuming centres, but the prospective poultry-keeper will do well to consider the increased costs of production and marketing on cheaper land away from these centres. The cost of transport on food to the farm and produce to the best market is a factor to be reckoned with, and must not be overlooked. Thus, it will be found that much of the commercial poultry-farming is carried out in and around Auckland, Wellington, and Christchurch, while other successful poultry-keepers are found in widely distributed centres such as Hamilton, Wanganui, Hastings, Levin, Masterton, and Oamaru, to mention only a few.

North or South

Not infrequently, newcomers to the industry inquire whether there is any marked advantage as between the two Islands. There are successful commercial poultry-keepers in both Islands, and it is not easy to give a definite answer in favour of either. Since far greater quantities of wheat are grown in the South Island, supplies of milling offal—pollard and bran—are available at lower costs there, and, economically, it would seem sound to select the South on this account.

Against this, however, must be set the fact that in the past surplus supplies of eggs during the season of greatest production (spring) have been transported to the North Island or sent overseas, which has appreciably added to marketing costs, and thus reduced the net return for eggs at the farm. It is obvious that future developments in marketing will have a marked effect upon the success or otherwise of all poultry-keepers after the war, irrespective of district or experience.

Effect of Climate

Not unreasonably, questions are asked regarding the effect of climate upon poultry, there being a marked difference in this respect as between, say, Auckland and Dunedin. This is a hard question to answer satisfactorily, and opinions will differ considerably on this point, since it is difficult to get indisputable data to support any comments made. There are, however, some indications suggesting that it is more difficult to maintain body size and constitution in poultry run in a warm, humid climate, such as is experienced in Auckland.

Furthermore, it would appear, from information to hand, that the control of internal parasites — worms, both round and tape—is more difficult in the North. These comments are based merely on general observations, and it is possible that climate may not be the primary factor involved. The health and constitution of any poultry flock depend to a great extent upon the ability of the individual poultry-keeper concerned, irrespective of whether the farm is situated in the North or the South Island.

Type of Land

It is not necessary to select the best type of land for poultry. It is desirable, however, to choose well-drained soil and to avoid heavy wet land. Providing the soil will grow green food, and preferably hold a good sole of grass, light, well-drained soil is best. Even if poor, much improvement in the cropping of green food can be effected by the proper use of poultry manure. Where a natural source of water is available, excellent results with green food crops may be achieved by the use of a small electric pump and a watering system during dry seasons.

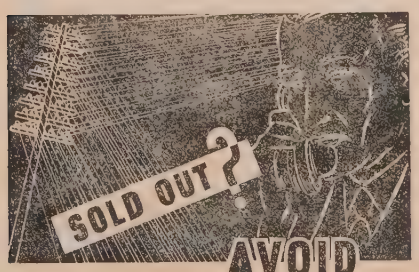
A level section of ground is desirable, and where possible some protection by grown trees or hedges from the prevalent winds is of considerable advantage.

Exposed sites on hilly ground are not to be recommended, even if such sections are low in cost per acre.

Land cheap to purchase initially can become most expensive in the long run when subsequent cost of production is taken into account.

Amount of Land

As stated in a previous article on this subject, the amount of land required will depend considerably upon the system of poultry-keeping to be adopted. It has already been suggested that where it is intended that the birds be given outside runs not more than 250 birds should be run continuously to the acre. This figure may be increased to 350-400 for young growing birds on free range, if this land is used



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Speaking generally, it is a sound policy to have a small surplus of land rather than to be overcrowded or even to have the land stocked to full capacity all the time.

This extra land allows for lighter stocking or more frequent resting of runs, which policy is an excellent insurance against outbreaks of disease. Should the new poultry-keeper not desire to overburden himself with land at the outset, it is a sound policy to ensure that an option can be obtained on adjoining land for future development.

Planning a Farm

There are so many different factors involved when planning a poultry-farm that only general guiding principles can be referred to here. Planning will be influenced by the system of poultry-keeping adopted, whether intensive or semi-intensive, for instance; the configuration of the land itself; the main object of the farm; whether to produce commercial eggs, pedigree breeding stock, table poultry, etc.; and many other factors.

One important piece of advice can be given, however. Whatever type of farm is contemplated, let it be planned with full reference to its probable ultimate size and object.

Too many poultry-farms just grow, and in consequence lack system and character. Careful initial planning need not necessarily involve additional capital expenditure, and may well save an appreciable sum of money over a period of years by avoiding unnecessary expenditure of labour, to name only one possibility.

Many old-established poultry-keepers have been heard to remark, "I wish I could afford to reconstruct or lay-out my farm again." This may be due to the fact that modern methods and equipment show marked economical advantages, but all too often it is due to the individual poultry-keeper having failed to plan his farm in the first instance, maybe from lack of experience or through thoughtlessness.

The newcomer to poultry-keeping can and should benefit from the experience of those who have gone before him, and from modern methods now being made available. The novice has been warned to obtain adequate experience before starting out on his own farm. It is now recommended that he consult someone experienced in poultry-keeping before laying out his plant. Above all, start with a carefully throught-out plan.

Established Farm

Buying an established poultry farm may have advantages where the purchaser wishes to get into production quickly, particularly today when conditions are unfavourable for the easy purchase of building material and equipment. There are, however, pitfalls to be avoided, and there may be definite disadvantages even if these pitfalls are avoided. Perhaps the main danger to be avoided is the purchase of an established plant which has failed as the result of disease. It is therefore desirable to ascertain, if possible, the real reason why the previous owner is selling up, and to obtain a candid opinion of the stock on the farm from an experienced person.

Improvements and repairs to existent buildings can be effected comparatively easily, but the eradication of some serious disease and the improvement in health and constitution of a flock of birds may easily take several years, and at an entirely unpredictable cost. Even if serious troubles of this nature are not met with, the purchaser is bound within certain limits to the ideas and planning of the previous owner. This may easily limit the ambitions and initiative of the newcomer.

Careful thought is necessary before purchasing a going concern, and once again the newcomer is strongly advised to get the opinion of an experienced person, particularly if the latter is acquainted with the district and perhaps even with the history of the farm itself.

(To be Continued.)

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Potato-Growing Competition

A MOST successful potato-growing competition was conducted by the Bunnythorpe Young Farmers' Club during last season. The results of the competition, together with the judge's report, were available in June last, but, unfortunately, lack of space precluded their publication in these pages at that time. The details are, however, of sufficient interest to warrant their inclusion here, even at this late date.

The following, prepared by R. E. Clevely, a member of the club, and also a competitor, gives an excellent account of the proceedings:

"The competition was open to all club members and farmers generally within the local Primary Production District, which area, it is interesting to note, includes practically every class of land, ranging from the rich alluvial soil of the Kairanga to the heavy clay soils of the uplands. It has always been considered, by those qualified to express an opinion, that excellent results could be obtained from the "harder to work and drain" clay lands —results to compare most favourably with those from the better soils.

Proved by Results

This contention was borne out in the competition. In fact, of the five leading competitors, four of their crops were grown on clay land, the heaviest yield, namely, 11 tons 14 cwt. per acre, coming from this type of soil. At least five varieties of seed potatoes were planted, weighing from 1 to 4 oz., while all crops were planted during October and November.

An interesting feature was the entire absence of potato-moth throughout the crops. Practically every crop received excellent cultivation, both before and after planting, the final figures proving, beyond doubt, that the most thoroughly prepared and tended soils produced the heaviest yields. Fertilisers used were, in every case except one, either superphosphate or serpentine super, at rates of from ½ to 7 cwt. per acre.

Valuable Lessons

"The results showed that potatoes can be most successfully and profitably grown in the Manawatu. Competitors and many others, club members and farmers alike, learned much from the visits paid to the crops during growth, and from the advice and encouragement tendered by the judge. The Bunnythorpe Club is greatly appreciative of the interest displayed by that Y.F.C. stalwart, Mr. A. J. Galpin, who inaugurated the competition and donated the £2/2/- prize awarded to the winner.

"This report cannot be concluded without mention of the work done by the judge, Mr H. de O. Chamberlain, of the Department of Agriculture, Palmerston North. Mr. Chamberlain had a most difficult task to perform, yet with his cheery optimism and expert knowledge, he carried out his arduous duties with credit, and his meticulous attention to detail ensured that everything of interest and value was noted. The judging demanded several visits to the crops, entailing much time and travelling, and the Bunnythorpe Club wishes to express its appreciation and gratitude to Mr Chamberlain for his valued contribution to the success of the competition."

Conditions

The conditions of the competition were as under:—

(1) Maximum area of plot—¼ acre.
(2) Plot to be pegged before judging.
(3) Yield to be judged on "table" basis; half weight of "seed" to count as "table"—"seed" to be from 2 to 4 ozs.
(4) Points to be given for (a) Cultivation, 12; (b) Yield, 2 points per ton; and (c) Freedom from potato-moth, 5. Cultivation to be judged at flowering time.
(5) Following to be stated: Variety of potato planted; size of "seed" and approximate weight of 12—whether cut or uncut, if cut when; fertiliser and quantity used; date of ploughing; cultivation before and after planting; dates of moulding, etc.

Judge's Remarks

The judge, Mr. H. de O. Chamberlain, gave the following report: "This was a most successful competition, because, in spite of difficulties, the Bunnythorpe Club members have still the courage of their convictions, and did their work enthusiastically and well. The main drawback, for competitors and judge, was the difference —both variety and size—in the seed used. This was quite unavoidable, but did not make for easy correlation of results.

"It has been definitely shown that the Bunnythorpe district can grow good potato crops, and further that the

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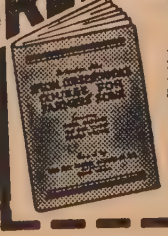

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.....J.A.

better cultivation yields better results. The point to be stressed is the necessity for the pre-cultivation of turf before ploughing. This is a matter for earnest consideration by all young farmers of the district. The plots were, on the whole, well put in and well cultivated; this and the obvious keenness of competitors and other club members made the judging a great pleasure."

Results

Details of the first three awards are given below; crop figures quoted having been reduced by 25 per cent., as is usual in competitions:—

C. S. Anderson, 1st: Variety, Aucklander Short Top. Cultivation: Turf disced various times; rolled; ploughed 9/10/42; fallowed two weeks, ten double cuts with discs, rolled twice. Planted 7 to 9/11/42, with 3 oz. "seed," uncut, scarified and moulded 14/12/42. Fertiliser, Serpentine Super, 4 cwt. Yield: "Table," 8 tons 2 cwt., "seed," 2 tons, 17 cwt. per acre. Judge's remarks re cultivation, etc.: Excellent cultivation, almost perfect moulds; slight trace of weeds. Points: Cultivation, 12; yield, 21½—total, 33½ points.

R. E. Clevely, 2nd: Variety, Arran Chief. Cultivation: Ploughed 10/8/42, disced 6 times. Planted 5 to 7/10/42, 1 oz. "seed," two rows only cut "seed"; cultivated and hand-hoed three times; moulded 23/11/42; sprayed with Bordeaux mixture, 16/11/42. Fertiliser, blood and bone, 1 cwt, Serpentine Super ½ cwt. Yield: "Table," 8 tons 8 cwt; "seed," 2 tons 2 cwt. Judge's remarks: Moulds good, cultivation good, soil free; trace of weeds; mosaic and leaf-roll. Points: Cultivation, 11; yield, 22—total, 33 points.

G. Wiggins, 3rd.: Variety, mixed. Cultivation: Ploughed May and August, 1942; planted, 23/10/42, 4 oz. "seed"; horse-hoed five times, moulded twice. Fertiliser, Super, two cwt. per acre. Yield, "Table," 8 tons 9 cwt; "seed," 3 tons 4 cwt. Judge's remarks: Low moulds, few weeds; mosaic and leaf-roll. Points: Cultivation, 7; yield, 22½—total 29½ points.

Three entries were withdrawn for various reasons, such as "blight," etc., during the competition, leaving 8 crops for the final judging. The Bunnythorpe Club members are to be congratulated on their enterprise and zeal in the undertaking and successful carrying out of this interesting and valuable competition.

News From Overseas

LETTERS from members overseas are always welcome. The following, from C. B. Anderson, formerly hon. secretary of the Bulls Young Farmers' Club, will be of interest to club members, particularly to those who were directly associated with him and knew him as a prominent and useful member of both the Wanganui Y.F.C. District Committee and the Wellington Council:—

Maadi, 30th October, 1943.
378261, Pte. C. B. Anderson,
A. Coy. 32nd N.Z. Btn.,
2nd N.Z.E.F., M.E.F.

"It is about time I dropped a line to let you know I am still on the map and still interested in the Y.F.C.

"I haven't had much luck to date as far as coming across anything of interest in the farming line is concerned. At the Lowry Hut, each Tuesday evening, they have what is known as a farmers' association meeting, and matters of interest to farmers come forward, usually in the form of a lecture. I believe they have had some very good speakers present on several occasions.

Egyptian Livestock

"One, a veterinarian, gave a talk on the livestock of Egypt and what had been done by way of importations to improve them. From my observations of the cattle and sheep—the latter more particularly—the efforts haven't met with much success. I believe the milking ability of the cows has been increased quite a bit, though, by the use of Jersey and Shorthorn and, possibly, other English breeds.

"Another person, who had lived in Russia for several years, and who had agricultural interests, spoke of the farming methods of that country. I have only been able to get along on one occasion so far. On that occasion, a talk was given on farming in N.Z., dealing mainly with the breeding and maintenance of a flock in the higher country. I hope to get along to a few more and will drop you a line later on.

"I have met quite a lot of chaps who were club members back home, and it offers a good connection to a chap, even if it's only for something to talk about.

Open-air Theatre

"I am enjoying myself quite well over here. So far, it has been a real holiday. What's to come, no one knows, but to date I have no regrets. There is plenty in the way of entertainment and refreshments. There is a large open-air theatre, known as 'El Djen,' fairly handy to our lines, and quite a few celebrities have played there. It will hold up to 8000—uncomfortably—but they all see the show. The last personality to appear was George Formby, and he gave us a good spin. He and his wife and the rest of his party were the first civilians to land in Italy since the invasion, and he has had a strenuous tour around.

"Well, I will close for now, and hope this finds you well, and that the Y.F.C. is still scratching along. We'll all be back to get things going again. All the best for the New Year. It certainly looks as though it will be a little brighter this time.

—As B.4,
Bill Anderson."

Reports on Club Activities

WESTERN SOUTHLAND.

Dipton.—Business meeting. Decided to send letter of congratulation to J. M. Crawford, a former chairman and secretary of the club, who has been awarded the scholarship to Lincoln College, donated by the Lincoln College Old Boys' Association, for 1943. Discussion regarding a field day and dance to be held in the new year. Arrangements for lecturer at next meeting. Seven members present.

SOUTH OTAGO.

Warepa.—Date fixed for first meeting in 1944—early in February. Lecture on "Farm Accountancy" by Mr. G. Ashcroft, relieving County Clerk, Balclutha. The speaker detailed, very fully, a simple system of bookkeeping to be operated by the farmer himself. This was followed by a lively discussion on county matters generally. Attendance of nine members.

DUNEDIN.

West Taieri.—Report on recent dance; credit balance of £4 2s. 5d. Club debate, the subject being "That the life of a youth on a sheep run is to be preferred to the life of a youth on a dairy farm." The speakers were P. Robertson, S. Quennell and W. Wilson (affirmative), A. M. Reid, G. McKenzie and D. Young (negative). Nine members present.

CHRISTCHURCH.

Ellesmere.—The speaker at an evening was Dr. I. W. Weston, of Lincoln Agricultural College; and the main subject of his address was the "International food conference" held in U.S.A. Eighteen members in attendance.

NELSON.

Murchison.—Business meeting. Arrangements for a field day in the autumn. Twenty-two members present; two new members enrolled. This club has now a total of 45 active members, and 19 members overseas. At the conclusion of the meeting, a social evening was held in conjuction with the junior branch of the W.D.F.U., the occasion being the birthday of the latter body.

WAIRARAPA.

Carterton.—A successful evening was spent, each member present reading an article from some farm journal, discussion following. Mr.

S. Freeman, Dominion organising secretary, who was visiting the district, attended the meeting and gave a brief talk on the Y.F.C. organisation and its present activities throughout New Zealand. Ten members present.

Masterton.—A "short talk" competition was held for the Falloon cup. Speakers as follows: R. McAnulty ("How to prevent bees swarming"); L. Heckler ("How the cow makes milk"); E. Hamil ("The advent and history of flight"); R. Nathan ("Hydatid disease); P. Evand ("Rotational cropping"); B. Clark ("Bee-keeping"). The Cup was awarded to E. Hamil. Messrs. W. F. McLaren and G. H. Perry kindly acted as judges. Mr. S. Freeman, Dominion organising secretary, was present, and spoke to the meeting on the difficulties being encountered and surmounted by the clubs throughout the Dominion at the present time. There was an attendance of 24 members out of a total of sixty-four.

TE KUITI.

Otorohanga.—Letter to be written to G. Neustroski, who has left for another district at short notice, showing appreciation of his work in the club. Offer from the local A. and P. Association to hold a stock-judging competition for Y.F.C. members at the show early in the new year. Lecture by Mr. J. F. Trapski, solicitor, on "The Fencing Act, impounding laws and sheep-worrying." Cases of interest were quoted, and many questions were answered. Nineteen members present out of a total of thirty-three.

BAY OF PLENTY.

Paengaroa.—One new member enrolled. The matter of calf-rearing was gone into, and it was decided to hold a competition again this year. A set of rules for the competition was drawn up. Arrangements made for a flannel dance. Fifteen members attended.

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Vitamin C is essential for growth and health. It helps to develop strong bones, healthy teeth and gums and sound blood-vessels.

Vitamin C helps wounds to heal quickly and firmly . . . it helps the body to fight infection . . . and is used up quickly when the body has a temperature. Hence the need, in cases of influenza and colds, for citrus and blackcurrant drinks, tomato juice and rose hip syrup.

You need plenty of green vegetables, fresh fruits, especially citrus fruits and vegetable drinks, to give you adequate Vitamin C.

Here are rich sources: Rose hips (an excellent source), blackcurrants, Chinese gooseberries, strawberries, gooseberries; the citrus fruits; Brussels sprouts, cauliflower, cabbage, tomatoes, fresh peas and beans, swedes, silver beet, potatoes, Sturmer apples, water from cooking green vegetables and swedes.

This summer — eat all the fruit and vegetable salads you can . . . try new ideas . . . don't waste a green leaf . . . Eat green vegetables and fresh fruit and keep well.

13

FOR A HEALTHIER NATION

THE GOOD NEIGHBOUR.

HAVE you ever received a Valentine? I can see you smiling at my query as you recall the lace-edged cards of yesteryear, with delicately tinted flowers and hearts adorning their tender messages; and perhaps for a few moments your thoughts will dwell on the senders. Perhaps you will even delve into some long-unopened box, and ponder over the sentimental trifles treasured therein. All the writers of verses seem to lay stress on the beauty of the beloved, causing you to peer into your mirror and shake your head as you murmur, "Valentines are only for the young and fair."

But if you pause to consider you will realise that beauty has many facets. Of what value is mere physical perfection if there is no intelligence or graciousness of character behind it? Age and decay must eventually overtake even the most fabled loveliness:

"Her beauty turned to a garden of blossoms, the heart's waste places:
Now she is old.
Had she but died in beauty, bitterly we had mourned her,
But she had lived for ever in the tales we told.
She was all men's desire. . . . Death alone has scorned her,
And she is old.
Only Death has denied her. In the shadow of his portal
Vainly she cries for release from life grown withered and cold. . . .
Alas for us all, who have seen such beauty that should be immortal
Thus grow old."

The beauty that is ageless is the beauty of the spirit within. Laughter lines are not unlovely. Ill-temper, worry and impatience, these are the despoilers which leave ugly traces upon the countenance. Cheerfulness and courage will grace the contours of any mouth. What matter the greying of those "silken tresses" if serenity has set her touch on our brows, and kindliness shines from our eyes? Here is a poet's tribute to a woman grown old in well-doing:

A Valentine

"As a white candle
In a holy place,
So is the beauty
Of an aged face."

Though one admires slender fingers pink-tipped as lotus-buds, the sturdy, capable hands that can prepare a dinner, clean a room, or soothe a child's hurt, are the ones in which a man puts his trust, and relies upon to create order and happiness in his home. The abiding quality of true love does not depend solely upon outward attractions.

Now that the custom of sending valentines is being revived to some extent, do not be concerned over Time's inevitable attentions; but make your everyday life a thing of such beauty that you will honestly merit the tribute offered by the most complimentary of valentines.

Mary

You'll Quite Agree

It should not be left solely to lawyers to work with a will.

If you are an anvil, be patient; if you are a hammer, strike!

Enthusiasm starts the race, but perseverance wins it.

You won't push far ahead by patting yourself on the back.

Any time is a good time to start carrying out an idea.

Experience is what you get while looking for something else.

Many people have a lot in them, but unfortunately they keep it there.

Helpful Hannah Says . . .

Next time you have the misfortune to burn a saucepan try boiling a small quantity of vinegar in it. The burnt food can then be removed easily.

* * *

When you have brasswork needing cleaning, rub it with a rag dipped in a solution of vinegar and a little common salt, and then wrung out. Polish with a soft dry cloth.

* * *

Mirrors can be kept immaculate by polishing with a duster dampened in a mixture of vinegar and water—2 tablespoons vinegar to ½ a pint water.

* * *

When you use only half an onion for flavouring, do not throw away the other piece—place it on a saucer, cut side down, and put a tumbler over it. This helps the keeping power of the onion considerably.

* * *

If tumblers have been placed one on top of the other and are stuck, pour cold water into the topmost glass and stand the outer one in hot water. Do not let the water be too close to boiling point because of the danger of cracking the glass.

* * *

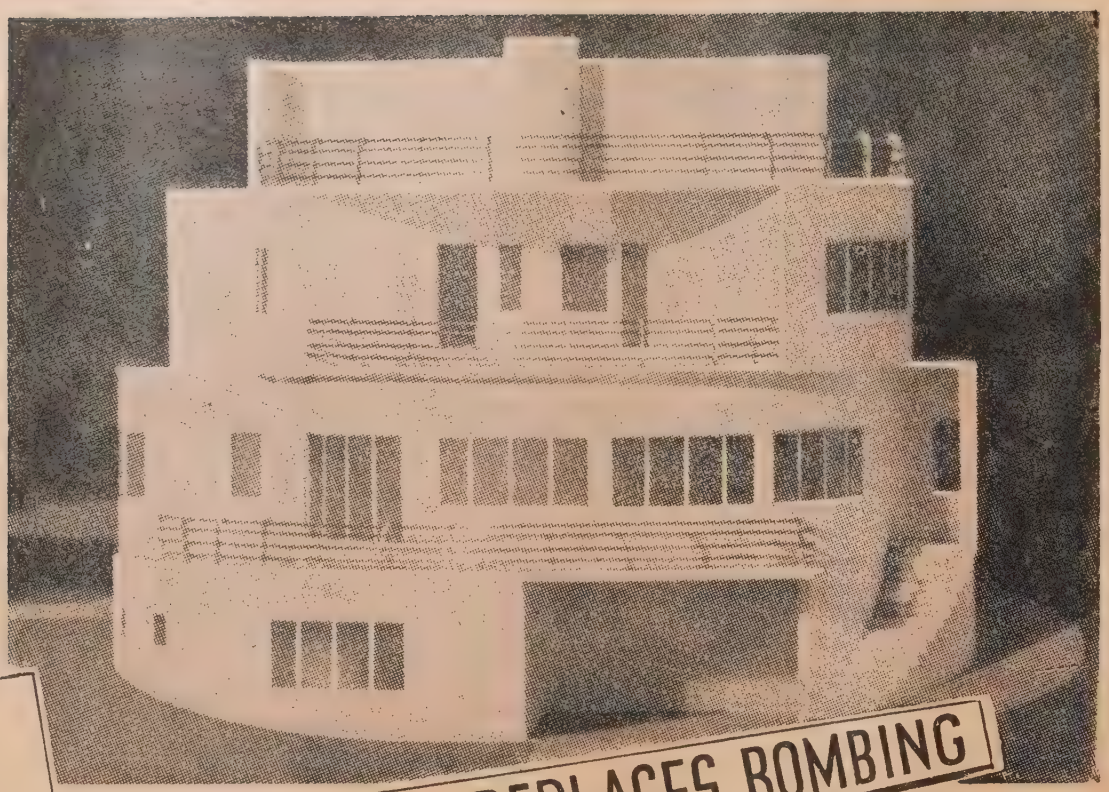
If your iron is too hot, and you find you have made scorch marks on a garment, sponge the place at once with diluted hydrogen peroxide, and then iron again. This will often cause the marks to disappear.

* * *

Towards the end of the summer one often finds a panama hat has lost its clean whiteness. Try sponging it with white shoe-cleaner (the liquid variety). You will be surprised how well it restores the hat to newness.

* * *

Did you know that salt is good for cleaning the stains from the inside of a teapot?



WHEN BUILDING REPLACES BOMBING

When the war is won, a brave new world will arise from the ashes of the old, and with it many good things will be restored to us. Among them will be Onehunga Blankets, available again in plenty. If you cannot buy Onehunga Blankets to-day, remember that the needs of the forces come first, and that Onehunga Blankets are one of the good things worth waiting for in our world of to-morrow.

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"Smells I Have Smelt"

Many and varied have been the contributions to this month's competition, "Smells I have Smelt." My nose has really been working overtime! Various sweet flower-perfumes and the smell of a newly-bathed baby had the greatest appeal for the majority of you, judging by the frequency with which they were mentioned, while as for disagreeable odours the repellent Maori bug was easily the most disliked. First prize to "Joyful Jill," Kaitaia, for her original and well-written essay. "Arethusa," Cambridge, was a close second. "Bart," North Auckland, was highly commended for her whimsical effort in the Jean Morton style, also "Rainbow," North Canterbury, for her verses reminiscent of Rupert Brooke.

First Prize

THIS competition brings back memories of childhood, the smell of the smithy fire, of burning hoof, as Dad fitted and shaped a shoe for a horse's hoof; of the fresh turned earth, of burning eucalyptus leaves, of the wild river-mint, when as children we rolled on it in play. I also remember the odour of burning flesh during a drought when stock died by the hundreds, and the heavenly smell of rain on burned bush and grass.

I recall most vividly the smell of cigar smoke in a railway carriage when travelling on our yearly holidays, the sharp scent of sea air, the tar of fishing nets, and the rancid smell of a shark caught in the fish trap. Every time I smell fresh paint, I remember the time our school was repainted and one could not get the smell of paint out of books and lunch for weeks afterwards. I also recall the smell of garlic eaten by the boy who sat next to me in class. The scent of golden wattle and mimosa will forever linger in my memory and even violets and roses cannot compare with these in my opinion.

But other smells—the bath-and-powdery smell of a new baby, the smell of a wild duck roasting in the oven, the homely fragrance of a plum pudding boiling, of fresh floor polish, of newly-laundered sheets, and above all, the hard-to-forget smell of an Australian aborigine when he is on the leeward side of one!, dead-but-not-forgotten fish, old kangaroo hides, scorched skin and mangy dogs, all combine with iguana oil to make a memorable odour. I cannot finish without mention of a pineapple plantation when the fruit is ripening and one literally follows a scent to his goal—a juicy, ripe pineapple just ready for the joy of eating.—**Joyful Jill, Kaitaia.**

Second Prize

I have smelt the new-mown hay when stacking has begun,
Ensilage gone sour, and left to rot out in the sun;
Violets in some shady nook, a honeysuckle bower,
Ragwort and camomile, and squashed poppy flower;
Stools with sandsoap scrubbed, and water swished in creamcans bright;
Pig-sties by the roadside, curd-drums exposed to light;
Cakes and bread just freshly cooked, steaming soup and meat;
A big, fat Maori-bug I once squashed 'neath my careless feet;
Keen the whiff of salt sea-breeze that comes up o'er the hill;
The dust a mob of sheep stir up when the day is hot and still;
Rain-washed fern and dripping leaves and banks of golden broom;
Stale hops, and old wet socks and clothes hung in the lumber-room;
Doctors' rooms and dentists' chairs and chemists' shops I pass;
Chloroform in hospitals, ammonia and gas;
Scented soap and powder, and Mary's pages bright and new;
Fish manure and blood and bone, and rotten duck-eggs, too.

—**Arethusa, Cambridge.**

Highly Commended

MOST of the "smells I have smelt" are bound with the joys I have felt, with happiness and laughter, with sadness or disaster. The tank of brine, a creaking winch, the warm friendly smell of humans packed close—a great troopship draws slowly out inch by inch—"Auld Lang Syne" like a benediction falls and I am left with a memory that the smell of tar and sea and khaki too oft recalls. A tousled sleepy head which I bend o'er to kiss—do heavenly cherubs smell half so pure as this? I do not know, but here, for me, is earthly bliss. The musk of new-mown hay is potent magic on a hot summer day. Crushed strawberries underfoot some warm spring morning, and it would seem I had captured the fragrance of a fairy as my loot. Blue bowls of apples, russet-gold—no wonder Adam was lightly bought and Eden sold for just one bite, ambrosia-scented. Not even I could have fast repented.

But,—I hate the smell of buttercups that cover all the fields and ousting the grass, lower production yields. The poet says it is the children's flower, but have they ever toiled above it, hour by hour? Sweeter far the soft breath of the small, shy violet and the blue forget-me-not hidden in some shady, half-forgotten spot.

Now what about a roasted turkey sizzling on a dish surrounded by every vegetable that you could wish? One sniff a gourmet's heart would please and mine at any time, with ease. I do not think that I should mention the smell of the old cow byre, the reek of the mud in winter, the stench of the mire. I shall forget them, to remember the honey scent of clover and render thanks to my Maker over and over for His blessed sense of smell.—**Bart, North Auckland.**

"MEMORY, imagination, old sentiments and associations are more readily reached through the sense of smell than any other channel," says Oliver Wendell Holmes. Smells are associated in my mind with different places. I have only to get a whiff of hot, burnt petrol, and if I shut my eyes I am back again in

the roar of a London street. Edinburgh is associated with smoke and the tang of the salt breeze which blows up over the castle crags as 'the siller tides rin up the Firth of Forth.' Glasgow is vaguely reminiscent of soot and old shawls. Round Paris there hangs the faint, elusive smell of Seine water. Italy is connected with the heady perfume of a trumpet vine and the smell of tomatoes ripening in the sun.—**M, Taranaki.**

THE smell of a church, the flowers on the organ, new varnish, the scent of a little perfume on a handkerchief; the refreshing tang of the night-scented stock, the clean air after a recent shower, the smell of soft moss

SMART ONES PLAY A WAITING GAME

If you want a new Berlei; and your usual store just hasn't your particular fitting in stock; are you going to grab the nearest fitting the store can find? Not you.

You're just going to make your present Berlei do until the store gets your exact size in. And if that's not possible and your need is really urgent, you're going round the other shops until you find it. There's bound to be one store which has your fitting, for Berlei are making enough garments for everyone.

So don't be a silly-billy and choose a Berlei that nearly fits. These days, with the restrictions on elastic, it's more important than ever that you get your exact fitting. Perfection is well worth waiting for.

★ ★ ★ ★

Look to these things when you buy your wartime Berlei.

1 *Try your Berlei sitting, for in that position you're a little larger round the hips than you are standing.*

2 *Allow room for freedom. Wartime Berleis haven't the capacity to stretch to your each and every action.*

3 *Remember your waist is very food conscious . . . bigger after meals than before. Allow accordingly.*

Berlei
TRUE-TO-TYPE FOUNDATIONS

on the side of a murmuring stream, the bush on a hot day; the smell of a patch of tomato plants, sweet peas on the wall—these are a few of many smells common to us all.—**Farmer's Wife, Puniko.**

THESE I have smelt:

The broom and gorse gold-gleaming
In river beds; and feathery, choking dust;
Honey-scented native bush; the burnt crust
Of toasted bread; and many smelling food;
Ploughed earth; the fine hungry smoke of wood;
And early morning dewdrops resting in cool flowers;
And flowers themselves; the fresh cut lawn;
And sheep in sheds before the dawn;
The salt sea smell in the south-west wind;
The children after bath-time, and washed hair
That curls; floor polish; and household ware
After spring cleaning; the cold
Earth under snow; and poppy seeds that hold
New life; ferrets and hemlocks and dusty hens;
Wet ones, too; and pigs in pens;
And sweaty men relaxed around the table
Consuming food as only men are able.
These smells, and more; but the best I've known
Stay with me and I think of happy care-free days
When noses unaware stored up
A host of memories.

—**Rainbow, North Canterbury.**

Competition

February:

Please let me share with you the thoughts and ideas called forth by our current competition: "From what source do you gain courage to 'carry on' when worry, grief or misfortune threaten to overwhelm you?"

Closing date, March 15th.

March:

Do you think children should collect stamps or keep fowls or help in the garden? Do you think they should be encouraged to read and choose their own books, or learn to play the piano or sing? Give reasons with your answers to our next competition: "What do you consider good hobbies for children?"

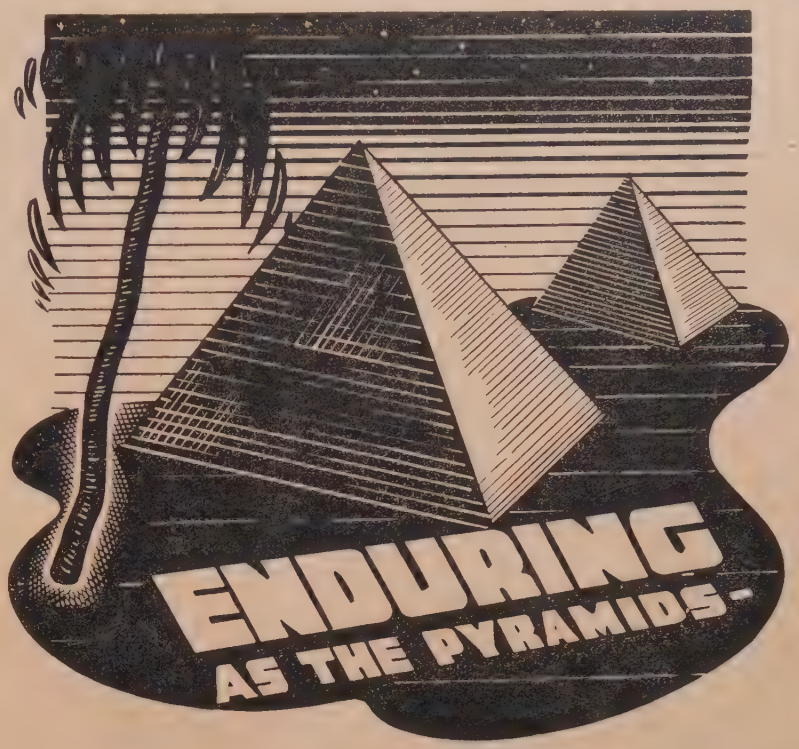
Entries close on April 15th, and there are two prizes, 10/- for first and 5/- for second.

"MARY,"
c/o. "Journal of Agriculture,"
P.O. Box 3004, Wellington.

Thou art my life, my love, my heart,
The very eyes of me,
And hast command of every part,
To live and die for thee.

—*Robert Herrick.*

To keep khaki-coloured shirts looking new after they have been washed, rinse them in water to which a small quantity of Condy's crystals has been added.



The Pyramids of Egypt contain, in still perfect condition, plaster work executed at least 4,000 years ago. This plastering outvies in durability the very rock it covers, where the rock is not protected by its shield of plaster. Plaster endures . . . and the core of Gibraltar Board is of enduring plaster-pumice.

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JOBS IN PEACE TIME

"THE NATION WHICH WISHES TO BE GREAT MUST PLACE ENTERPRISE AHEAD OF SECURITY—"

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SUMNER H. SLICHTER,
Professor of Economics, Harvard University.

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Choose Your Partner

DID YOU know that from earliest times the countryfolk of England believed the birds always chose their mates on the fourteenth of February—St. Valentine's Day?

For nothing this wide universe I call,
Save thou, my rose: in it thou art my all.
—W. Shakespeare.

Chaucer, famous for his Canterbury Tales, and whose stories entertained a queen and her court, refers to this quaint belief and Shakespeare, too, makes mention of it. Thus, following the example of the birds, it seems meet that the young people also should select their sweethearts on that particular date, this being done by lot according to the old Roman custom of drawing inscriptions from an urn at the feast of Juno.

Indeed, in the south of Scotland, the list of participants was not confined to the fair and eligible alone, and sometimes a youthful swain found he had drawn the name of an elderly widow to be the object of his attentions for the next twelve months. I wonder how many of these valentine-alliances became permanent!

The practice of sending missives to the person upon whom the writer wished to bestow his affections became general in the nineteenth century when the introduction of penny postage made the honouring of St. Valentine's Day a much less expensive matter than in Samuel Pepys' time. Then the gentry had to drive long distances by carriage to deliver their Valentine tokens. A golden guinea was a favourite present, and we read of one fortunate damsel who received silk hose and other articles of apparel "to the value of twenty-eight shillings." Pepys also records giving his wife a very beautiful ring which had taken her fancy, together with her name "writ upon blue paper in gold letters."

Gradually this exchanging of gifts died out, and with the practical encouragement afforded by the new postal rates the sending of valentine-cards increased mightily and flourished for another century. The spirit of romance which permeates these dainty little souvenirs with their decorations of roses and cupids has been preserved for future generations by the noted author, Charles Lamb, who deemed valentines a worthy subject for one of his delightful essays.

No Place Like Home

JUST before this war broke out I was fortunate enough to enjoy a month's holiday in Australia. We joined in with a party of New Zealand and Australian farmers and train-travelled all the way after we left Sydney. Our particular trip covered parts of Victoria and New South Wales. En route we visited large stud farms, stations, etc., and became acquainted with the many and varied types of farming being carried on over there. It was so interesting for the men-folk to compare notes on their travels, and they learned much from the pastures new, for as each day unfolded we saw more and entirely fresh scenes. We womenfolk, too, learned a great deal, and were just as interested as the men in all we saw and heard. Naturally, of course, we were curious to see how the farm women managed their homes, we wanted to compare notes to see if the home life of the Australian family differed very much from our own home life.

Actually there was little difference, as farming communities exist on pretty much the same lines all the world over. However, a very noticeable difference did exist in the actual farm houses that we saw. The Australian farm houses were a disappointment so far as structure went. Of course often they were beautifully furnished, and comfy enough inside, but they were so dingy outwardly, and there were none of the new up-to-date homes we see here. Many of them were brick and concrete structures. I missed the dainty frilled curtainings and neat windows that most of our New Zealand homes display. Possibly the climate has a great deal to do with this, for the muggy heat brings with it many pests, and for this reason the windows are entirely covered by heavy frames, and the fine wire-gauze in these completely masks the whole window.

Well, having compared homes, we must credit New Zealand to the full for the modern and comfortable homes designed and built in town and country alike. Home means a lot to all of us, so why not make it a worthwhile place in which to live? Here is a definition of the beloved word "home" which is a special favourite of mine:

"Home—a haven, or a little hollow scooped out of the windy hill of the world, where we can be shielded from its cares, and its annoyances."—**Hoya, Okoia.**

In . . . her face . . .
Sorrow was there made fair,
And Passion, wise; Tears, a delightful thing;
Silence, beyond all speech, a wisdom rare;
She made her sighs to sing,
And all things with so sweet a sadness to move
As made my heart at once both grieve and love.

—Anon.

There is a Lady sweet and kind,
Was ever face so pleased my mind?
I did but see her passing by,
And yet I love her till I die.
Cupid is winged, and doth range
Her country—so my love doth change;
But change she earth, or change she sky,
Yet I will love her till I die.

—Thomas Ford.

There is a garden in her face,
Where roses and white lilies grow:
A Heavenly Paradise is that place,
Wherein all pleasant fruits do flow:
There cherries grow that none may buy,
Till "Cherry ripe" themselves do cry.
—Thomas Campion.

* * *

Better is a dinner of herbs where love is, than a stalled ox, and hatred therewith.

Presenting

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Baking Powder PLUS is not a new brand of baking powder. It signifies the perfection of a formula for making Baking Powders today which places them far ahead of pre-war baking powders. Every reputable manufacturer of baking powder in New Zealand is now using the baking powder PLUS formula. Twentysix of New Zealand's best known cookery experts have tested this Baking Powder formula in separate exhaustive experiments and have expressed absolute satisfaction. They agree that this new type Baking Powder assures perfect texture, aeration, keeping quality and taste, PLUS the priceless ingredient—Phosphorus.

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Pre-war baking powders (even the best of them) used an ingredient for aerating or "rising" which conferred no other benefit than aerating. The new baking powders use Phosphate as an aerator and thus supply phosphorus to the body. New Zealand soils and foods are deficient in phosphorus. They do not supply the phosphorus needed as a regular intake not only for bone and teeth building, but for nerves, digestion and general tone. Over 20 year ago Britain and America switched to phosphate baking powders because they were BETTER baking powders PLUS a priceless health ingredient—Phosphorus. Even before the war it was hard to buy an old type baking powder in Britain or America.

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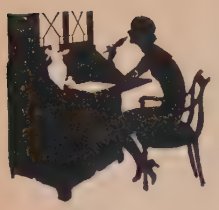
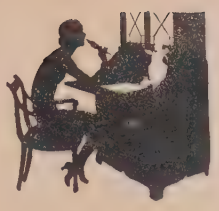


Mary's at - Home -



I, TOO, appreciate a "room with a view." Just a chain from my front windows are the everchanging waters of Queen Charlotte Sounds, with the steep green bush-covered hills only a short distance away. The sunsets are marvellous. As I look towards the Grove Arm the sky changes from gold to flaming red, the blue hills turn to deep purple, with the sea as a mirror. I am always hoping to paint these glorious scenes in water-colours.—**Z.M., Picton.**

WHILE we were living in Hobart my brother went on a visit to a farm and one lovely day we all went for a long drive to the place where he was staying. It was a rough bush road and on the way, our horse stumbled and fell, breaking the shafts of the gig. We were miles from anywhere and the evening was coming on, so my mother decided to camp where we were. After making a fire and gathering dry ferns to use with our rugs for a bed, she gave us a meal and we were soon fast asleep. She herself kept awake till morning when we were able to get help and continue on our way. My deepest regret was that a box of chocolates which I had saved from Christmas for my brother, became a smashed and sticky mess when the horse fell.—**Rosemary, King Country.**

MAY I join your "At Home"? Your talk entitled "Are you two faced?" made me think of the truth conveyed in these lines:—

"The choicest garb, the sweetest grace,
Are oft to strangers shown.
The careless mien, the frowning face,
Are given to our own.
We flatter those we scarcely know,
We please the fleeting guest,
And deal full many a fleeting blow
To those who love us best."

"Yes, "Sunny," I have five scrap-books into which I either copy or paste clippings and extracts which appeal to me. I can understand when you say that yours is one of your most precious possessions, because mine are to me my comfort and inspiration.—**Autumn Tints, Waikato.**

AS CHILDREN we were fortunate enough to have a big garden to play in. A huge pond where the horses watered and which held the water to drive the wheel for chaff and wood cutting was a great attraction. It was here that I learnt to ride a horse and milk a cow—both thrills to me at the time although I was not so fond of the latter when it became my job later on.

The arrival of an Edison phonograph and six records brought us a great deal of pleasure, as did a piano in later years. A trip to the 1907 Christchurch Exhibition was one of the big events of my childhood and what a lot it gave us to talk about after it was over. Looking back now, I think our parents must have been heroes to travel so far with a young family when they could have enjoyed themselves so much better without us.

I was interested in "Sunny's" paragraph about writing out favourite verses or thoughts. I have always meant to do this, so now I had better make a New Year resolution to start a scrap-book. Hobbies and outside interests help our minds to remain alert and keep us young. Too often women are so wrapped up in household affairs that when these no longer have a call upon them they are at a loose end.—**Ysthbeth, Canterbury.**

HOW I wish you could have a bunch of fresh flowers out of our garden —just ordinary blooms, yet how wonderful. Masses of colour: reds, pinks, blues and white; sweet williams with four or five colours in each head. And there are cabbage, cauliflowers and new peas daily, and a dish of sun-ripened strawberries.—**Margaret, Feilding.**

ONE of my early recollections is of the Lord's Prayer. The words "Forgive us our trespasses," always puzzled me as I thought the congregation said "dress-baskets" (which were fashionable at that time!) It was a long while before I realised what the correct word was. So, fellow readers, please remember to recite the Lord's Prayer distinctly for small ears.—**Katrina, South Otago.**

RIGHT now I should be ironing, but instead here I am writing to you to show my appreciation of your pages. What a happy crowd the New Zealand farm women are. I wonder if city folk envy us? I always give a contented sigh when we return home after a day in town, although I was a city girl before I married, and it wasn't just a little country town either.—**Young Mother, Nelson.**

IN these days when so many of us have to "stay put" it is wonderful to have such a hobby as gardening. I heartily agree with Floral Lady, of Southland, who says: "I would rather go stockingless than have to do without my garden."—**K.R.J., Northland.**

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DON'T you think this is a coincidence? A lad we know of has been corresponding with a lad over in Canada ever since he was ten, and he is nineteen now. About a year ago he left New Zealand with the R.N.Z.A.F., and when he arrived at Canada he was stationed at the same place as his pen-friend. Naturally there was great excitement, and he is having a grand time over there, as everything is up to expectation, and his new-old friend cannot do enough for him.—**Just Say, Pokeno.**

I DO enjoy hearing all about our Good Neighbours, Mary. They seem such lovable people. I am sure you were delighted with Tinkle Tinkle's birthday gift for you. Then Tiggety Boo suggests that after reading your lovely idea of cultivating friends as a hobby, we should look around us and make some one happy. I think that is an excellent idea. There are so many people just needing a friendly, helping hand—no district is without them. I have just had such a happy week-end. Three friends came to stay, and two of them rode to their heart's content. Saturday night we went to my Bible Class social, which was a huge success, and then over to the pioneer memorial church of St. David's on the Sunday.—**Peggy, Pleasant Point.**

THE other month the Good Neighbour was filled with spring, but up here summer seemed to be dashing in, and the scents from the garden were really overpowering. And I have been digging for victory too! Already there have been pictures of that dear old fellow, Father Christmas, in the advertisements, reminding us that time is getting beyond our control, and yet tonight I am sitting by a little fire of toasting coals, and enjoying it. We have been busy lately, and have not seen much of town. But when we do get there I always manage to stop at the florists, pretending that I am looking at the vegetable section, of course. It is time for the young here, and we have 51 chicks, 17 ducklings, 22 calves, and 8 lambs. The cat made a contribution too, but the heartless member of the family had to destroy them.—**M., Feilding.**

NO more cream allowed—well it didn't worry me a great deal, as I seldom indulge in it, but when I asked my three-year-old daughter the other morning if she would have milk on her porridge, she said: "No thank you, mummy, I want cream." I replied that we had no cream now, and she said, "Well, I don't want any porridge at all." I told her she was a very lucky girl to be able to have as many eggs and vegetables as she wanted, as there were so many other people who had to go without. If we stop to think how lucky we are, most of us would find time to offer up a prayer for those not as fortunate as ourselves.—**Lucky Lass, North Auckland.**

LAST Christmas, I invited a cousin, his wife, and five children to spend a three weeks' holiday with us. Our house is large, and on a farm there is always plenty of room for them to scatter. What an experience! I am sure I hope I never have such an invasion again. Although the mother and father were perfect gems, the children, who have been spoilt from babyhood, were just the opposite. They took charge of, and squabbled over, my kiddies' toys; at afternoon-tea time they gathered round the table, eating and stuffing, so that the grown-ups hardly found a crumb left on the plates by the time the tea was poured—and not a word of rebuke from their parents! My own children do not have morning or afternoon tea, so just stood back in astonishment. The children had their dinner at twelve, and were asked to go outside afterwards so that we could have our dinner in peace. But did they go? Not them. One day I bristled up and sent them out, locking the door as the last one doggedly crawled out. I turned round triumphantly with a sigh of relief when, hey presto! the first ones were already half-way through the window. These children were all adored by their parents (they had a big family because they both loved children), none of them do a tap in the home, and they are all very cheeky to their parents. They never said "Yes, please," or "No, thank you"—in fact they were just a bunch of little horrors. Now is it kindness to love your children so unselfishly—what kind of men and women are they going to be?—**Way Down South, Southland.**

WORTHY SONS OF NEW ZEALAND
... AND THEIR FAVOURITE SMOKE IS ...

114A

The NEW ZEALAND CIGARETTE TOBACCO

Mary's Mixing Bowl

Tomato Time

HOUSEWIVES are always glad when the tomato season begins. These "love apples," as they were once called, not only have excellent dietetic qualities, but their luscious redness adds colour to the most insipid dish, and is attractive to the eye, while their flavour pleases jaded palates.

Raw tomatoes are specially rich in vitamin C so necessary for the maintenance of a healthy bloodstream and the prevention of tooth-decay; they also contain vitamin A, which promotes growth and vigour, and vitamin B, the lack of which causes loss of appetite, beriberi and other disorders. These last-named vitamins are not destroyed by cooking.

Fresh, fried, baked or stewed—serve tomatoes at every meal as long as they are available. Here are some new ways of preparing them:—

TOMATO FONDU.

Two eggs, 1 cup milk, salt, 1 cup tomato puree. Beat the eggs, add milk, then stir in the tomato puree gradually, salting to taste. Pour into a pie-dish and stand it in an under dish of water, and bake slowly till set.

TOMATO SAVOURY.

Four ozs. macaroni, 2 ozs. tomato puree, salt, 1 onion. Cook the macaroni in salted water till soft. Drain and add tomato and the onion (grated) and salt. Place in an open dish, dot with butter, and bake for half an hour. Serve hot.

TOMATO CRUMB.

One lb. tomatoes, 2 cups breadcrumbs, 1 onion (minced) salt to taste. Slice the tomatoes and place alternate layers of tomatoes and breadcrumbs, sprinkled lightly with salt, in a pie-dish, putting the onion in with the middle layer. Finish with a topping of breadcrumbs. Dot with small knobs of butter. Bake in a moderate oven till the breadcrumbs are crisp and brown.

APPLE AND TOMATO PIE.

One lb. apples, 1 lb. tomatoes, 2 onions, salt, 3 ozs. cheese. Grease a pie-dish and place in it a layer of sliced apple, some chopped onion and a layer of sliced tomatoes. Add salt. Repeat this till the apples and tomatoes are finished, then cover with a thick layer of grated cheese. Bake in a moderate oven about 50-60 minutes. Serve with cooked greens.

STUFFED TOMATOES.

One lb. tomatoes, salt and pepper, 3 ozs. cheese, 1 teaspoon thyme and parsley, 1 cup breadcrumbs, 1 tablespoon finely grated onion. Scoop out the centres of the tomatoes (it is advisable to choose firm, large tomatoes) and mix with the breadcrumbs, onion and cheese. Add the herbs and seasoning, and fill the tomatoes with the mixture, piling the remainder on top. Put a small piece of butter on each and bake in a quick oven till the tomatoes are soft and cooked.

PRESERVING.

While tomatoes are plentiful it is a good idea to preserve some for winter use. Here are two methods which you will find satisfactory:—

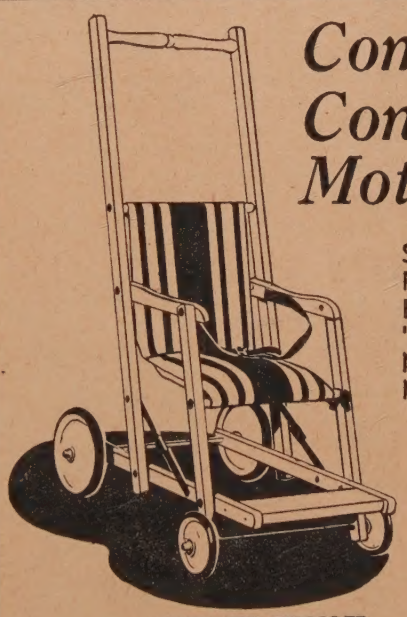
Bottled Tomatoes: Tomatoes, salt, water. Choose firm tomatoes, but not over-ripe. Wash and dry them and pack into sterilised jars. Pour over tomatoes water which has previously been boiled and cooled. Add salt in the proportion of 1 teaspoon per quart jar. Screw lids on tightly; give a half screw back. Place on rack in preserving tin. Cover with cold water, bring to boiling point and boil for five minutes. Remove jars. Screw lids tightly, then leave jars inverted till cold.

Tomato Pulp: Tomatoes, onions, salt. Wipe and cut up tomatoes. Add 1 teaspoon of salt to every 2 lbs. of tomatoes. Add whatever quantity of onions desired. Cook gently till the tomatoes are soft (do not add any liquid). Press through a colander to remove the skins, then boil the pulp for 15 minutes, and pour into hot sterilised bottles. Seal at once and dip in melted wax to make sure the tops are airtight.

TOMATO JELLY.

Here is a recipe for tomato jelly, also other combinations which are tasty with cold meat, to say nothing of their value in stews and savouries.

3½ cups sliced tomatoes, 1 teaspoon each salt and cinnamon, 1 tablespoon sugar, 2 tablespoons gelatine, 2 sliced onions, ½ cup water. Cook the



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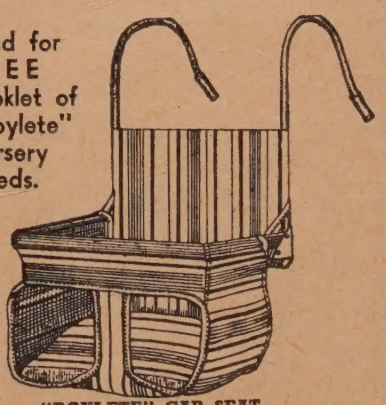

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tomatoes, onions, salt, cinnamon and sugar together for ten minutes (add pepper if liked). Strain through a colander and bring the mixture to boiling point again. Now add the gelatine previously dissolved in ½ cup of water. Stir well. Pour into jars to set and tie down when cold.

TOMATO RELISH.

Three lbs. tomatoes, 4 onions, 1 lb. sugar, 1 oz. curry powder, 1 oz. salt, ½ oz. mustard, 1½ ozs. flour, 3 cups vinegar, ½ teaspoon cayenne pepper.

Slice the tomatoes and leave covered with salt for 8-12 hours. Then drain off the water. Prepare the onions separately in the same way. Place vegetables and vinegar in a pan and boil for five minutes before adding the sugar. Mix the dry ingredients with a little cold vinegar. Blend this with the boiling mixture, stirring thoroughly. Boil another ¾ hour before bottling.

TOMATO CHUTNEY.

Two lbs. tomatoes, 2 lbs. apples, 1 lb. brown sugar, ¼ lb. salt, ½ oz. ground allspice, 2 large onions, 1½ ozs. ground ginger, ½ bottle vinegar.

Slice the tomatoes, peel and slice onions and apples, add other ingredients and simmer gently for 2½-3 hours.

TOMATO SAUCE.

Six lbs. tomatoes, 1½ lbs. apples, 1½ lbs. onions, 6 ozs. salt, 2 ozs. peppercorns, ½ teaspoon ground ginger, 2 breakfast cups vinegar, 1½ lbs. white sugar.

Slice tomatoes, peel and slice apples and onions. Add peppercorns, tied in a muslin bag. Put into preserving pan together with the remaining ingredients, except the vinegar, which should be added ¼ hour before taking the sauce off the stove. Boil 2½ hours before adding vinegar. Press through a sieve, working as much of the pulp through as possible so that the sauce will be of a fairly thick consistency.

TOMATOMINT.

To make the best possible use of your crop, utilise any unripened tomatoes remaining, as follows:—

Six onions, mint-leaves to fill a pint measure, ½ lb. apples, 1 lb. green tomatoes, 1 pint vinegar, 1 dessertspoon salt, 3 ozs. sultanas, 1 teaspoon mustard, 9 ozs. sugar.

Mince the onions, mint leaves, apples and tomatoes, and add the sultanas. Blend the salt, mustard and sugar with the vinegar and bring to boiling point, and then add the other ingredients. Cook gently for 30 minutes till the mixture has a mellow taste.

GREEN TOMATO RELISH.

Three lbs. green tomatoes, 1 lb. onions, salt, 1½ lbs. apples, 1 pint vinegar, 6 ozs. sugar, ½ teaspoon ground ginger, 1 teaspoon mustard, ½ teaspoon powdered cloves. Peel and slice onions, slice green tomatoes and sprinkle with salt, leaving to stand for 10 hours. Drain off the liquid. Peel and slice the apples and cook all together with the remainder of the ingredients for 1¼-1½ hours till pulpy. Pour into small jars and seal.

GREEN TOMATO JAM.

Green tomatoes, sugar, lemons. To every lb. of sliced green tomatoes allow 1 lb. of sugar and the juice and shredded rind of a lemon. (Less lemon rind can be used if desired). Cook till a little jells when left on a plate, then bottle.

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CHOCOLATE BREAD PUDDING.

2 cups stale bread, ¼ cup sugar, 2 eggs, 1½ tablespoons cocoa, ¼ teaspoon salt, 1 teaspoon vanilla, 2 cups hot milk.

Cover bread with cold water, and allow to soak ¼ hour. Squeeze out the water, add the bread to the milk, beat the egg yolks slightly, add the egg yolks and all other ingredients to the mixture. Pour into a buttered pyrex dish, and bake for ¾ hour. (I find it advisable to stand dish in a pan of water to prevent curdling.) Whisk egg whites stiffly, add 2 tablespoons castor sugar. Pile on top of pudding, and return to oven to brown.—**Brynmawr, Aramoho.**

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